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THE VOICE OF NEW JAPAN

DR. SCHURMAN'S SPEECH ON EXTRATERRITORIALITY

SAUCE FOR THE GANDER

THOSE UNEQUAL TREATIES

JAPAN'S PLAN FOR THE RECONSTRUCTION OF CHINA

RUSSO-JAPANESE TREATY

BARON OKURA

THE PIONEER OF SINO-JAPANESE CO-OPERATION

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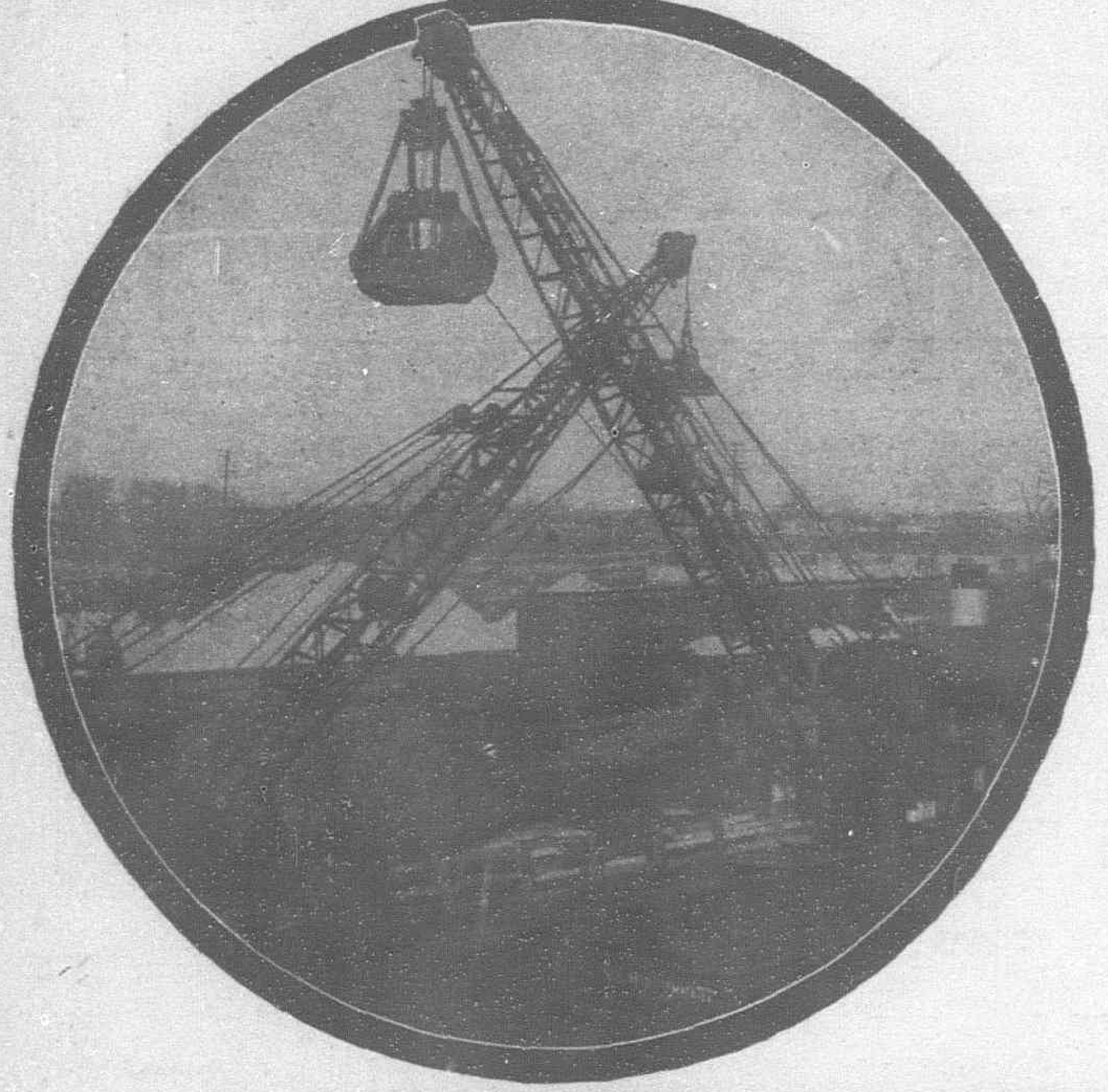

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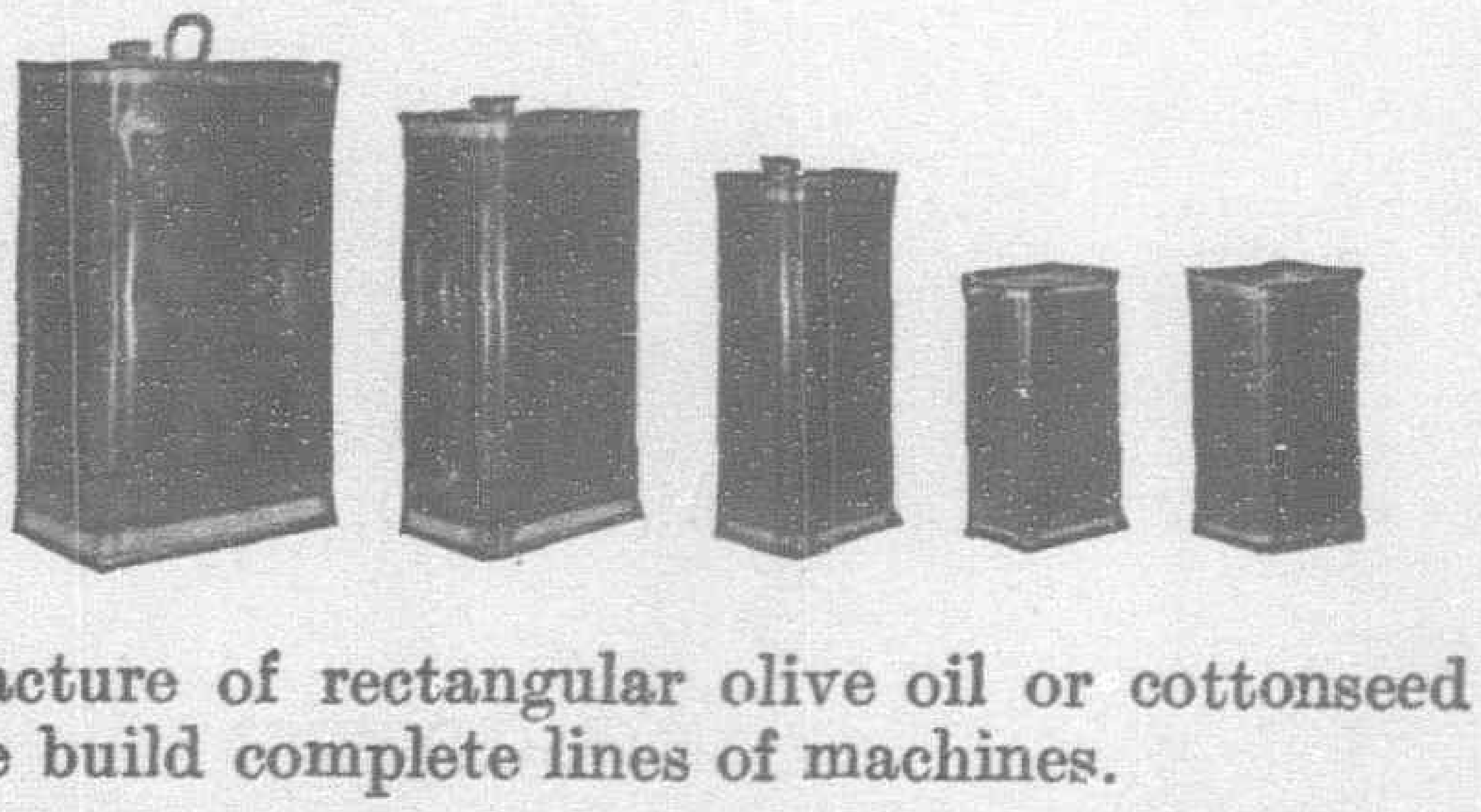

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The Far Eastern Review

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The Voice of New Japan

A Message Pregnant With Meaning

Baron Shidehara Proclaims a New Doctrine of Asiatic Independence

With Patience and Sympathy, Forbearance and Hope, Japan Stands by the Chinese People in their Struggles for Self-Government and Guarantees that their Administrative Independence will be Respected

TRUE friendship between nations is the outgrowth of an intelligent and sympathetic understanding of each other's problems, maintained and strengthened by broad-minded statesmanship and open diplomacy. The continuity of such relations is assured by reciprocal trade and economic co-operation. This truism has been accepted by the rulers of Japan as the corner-stone of their relations with China. The future of these two peoples is bound up in each other. If China breaks under the strain of her present troubles it is only a question of time when Japan's political independence will be placed in jeopardy. Looking far ahead into the future with that same prescience which a century ago influenced an American president to proclaim a fundamental policy for the perpetuation of American independence and democratic ideals of government in the western hemisphere, the statesmen of Japan have laid down a program which will assure to the people of Nippon their right to exist in that quarter of the globe to which they are confined by the operation of the exclusion laws of other lands.

Like the Monroe doctrine, this basic policy of Japan carries no menace to the peace or security of her Asiatic neighbors or to the commercial rights of other nations. It is direct, honest, sincere and commendable. No power or combination of powers can stop the gradual evolution of a doctrine based on friendship. No power or combination of powers can impede the eventual coming together of China and Japan in bonds of enduring understanding as the Chinese people become convinced of Japan's sincerity. The fundamental policy of Japan received its initial impulse from her business men, her financiers and industrialists who rebelled against the program of the militarists and impressed upon their rulers the necessity of a radical and immediate change in Japan's attitude towards China. In five years, the new program has worked marvels. China and Japan have compounded many of their troublesome differences and are now well along the road to a full understanding. For the first time in twenty years it may be said that public opinion in China is not unfriendly to Japan. A new era is opening for both nations, one that will bring security, increased prosperity and enduring peace to Eastern Asia.

Distracted by the chaos and civil wars in this country, Chinese and foreigners alike have ignored the rapid *rapprochement* between China and Japan. The full expression of this new trend in Far Eastern politics can be read between the lines of the speech of Japan's foreign minister at the opening of the present session of the diet. It is pregnant with meaning. In it will be found a declaration of faith, hope and sympathy with the Chinese people in their present troubles and a guarantee that there shall be no further impairment of their sovereign rights by the establishment of international control over any of their administrative organs. This announcement of Japan's new policy towards China is identical in spirit and tone and is based upon the same lofty principles which impelled President Wilson to withdraw official support to the American group in 1913. Coupled with a firm determination to defend at all costs her hard won economic position in Manchuria and Mongolia, is seen a resolute intention to stand with China against any combination or influences inimical to the position she rightfully enjoys and is entitled to amongst the nations.

Baron Shidehara's presentation of Japan's new outlook on world affairs and his declaration of her aims and aspirations will stand as one of the most important political utterances of the year, a message to other nations whose full weight will be understood at once by those in charge of their foreign relations.

"Admittedly," he says, "the nations of the world have not, so far, fully recovered from the paroxysm of the late war. Their financial and economic conditions still remain abnormal. Nor has complete stability yet been restored in international relations. The realization of the highest ideals of humanity would seem still far off. It, however, admits of no doubt that the age of international antagonism is passing, and that in its place an era of international co-operation is dawning. This new order of thought is styled, in some quarters, as Internationalism, and denounced on the grounds that it is incompatible with nationalism and repugnant to national interests. If nationalism, so-called, implied the selfishness of a nation—if it assumed that all other nations should minister to the convenience of that particular nation—it is obvious that such a doctrine is irreconcilable with the present drift of world affairs. If by 'national interests' were meant those of an immediate and transient nature or any special advantages enjoyed by a small section of the nation, it is equally obvious that they can find little support in the awakening consciousness of mankind. But the earth is not made to suit the will of a single power. No nation, however, powerful in strength, however rich in resources, can have its own way in the council of nations. History shows that all attempts made by any power, in reliance upon its strength and resources, to force its will upon the rest of the world are doomed to grievous failure. The true and lasting interests of a nation can be secured only when they are in keeping with the rightful positions of other nations on a fair and equitable basis. UPON THIS FAITH WE STAND AND PROPOSE TO REGULATE OUR RELATIONS WITH ALL FOREIGN COUNTRIES.

"As to our policy towards China, I ventured to lay before you its general outlines in the last session of the diet. I made it clear that we were resolved to respect the position which China justly enjoys, and at the same time to safeguard the position which is rightfully assured to us. I also declared that we had no intention whatever of interfering in any domestic affairs of China.

"In September of last year hostilities unfortunately broke out between Kiangsu and Chekiang, leading to a still more serious warfare between Mukden and Chihli. For a time, grave disturbances prevailed in China. In the presence of this situation, we have consistently conformed ourselves to the policy already enunciated.

"In the first place, we have constantly kept in view the safeguarding of our rightful position, and, in particular, of our rights

and interests in Manchuria and Mongolia. In order to provide against any possibility of these rights and interests being ignored and unprotected as a result of the recent fighting around Shanhaikwan, we addressed an identic communication to the two warring parties on the thirteenth of last October, frankly calling their attention to our position in regard to the situation.

"It need hardly say that our concern is not confined to the condition of affairs in Manchuria and Mongolia alone. We are interested in the whole of China to an extent and in a degree absolutely essential to our national existence. But more particularly keen are our national sentiments over Manchuria and Mongolia, because of historic reasons in addition to those general considerations. I refer to the fact that Japan, in self-defence and in the interest of peace in the Far East, staked the country's fortunes on two great wars in the Manchurian plains. By such supreme efforts, we are now enabled actively to engage in peaceful undertakings in that region. I desire to repeat here once more what has been so often declared by the Japanese government, that we have no aggressive or territorial designs of any kind in in that or any other part of China.

"Secondly, we have followed with the strictest exactitude the principle of non-interference in China's internal politics. We have absolutely refrained from supplying any party in China with arms, munitions or loans that might be utilized for the purpose of continuing hostilities. Knowing that the Chinese people were sick of war, we believed that the refusal of assistance to any particular party in China was, in effect, assistance rendered to the whole nation of China. Another point to which we attached particular importance was our belief in international good faith. The Japanese government already subscribed some years ago to the resolution of the powers prohibiting supply of arms and ammunition to China. We further declared on more than one occasion our policy of non-interference in the domestic troubles of that country. We have now translated these commitments faithfully into fact.

"What has been the result of this attitude? I am happy to believe that the sense of justice and fairness with which we have met the situation is now widely appreciated not only by the Chinese people, but by all the powers of the world, with a consequent marked improvement in our relations with China and increased mutual confidence between us and the other powers.

"With the assumption of the office of provisional executive by Marshal Tuan Chi-jui, we have, on consultation with the powers, recognized his government as the 'de facto' government of China. We are not directly interested in the question, who will assume the reins of government in China, or what constitutional system may be adopted in that country. With a long historical background and amidst the surroundings peculiar to the country, the Chinese people must be left free to order their own national life in their own way. All that we consider important is that China should be provided with a sufficiently strong government to fulfil her international obligations in good faith and to maintain peace and order within her borders.

"Believing that the provisional government of China are seriously striving to attain these objects, we pray with deep sympathy for their success, and we are further prepared to render to China, in common with the other powers, such friendly assistance as may lie in our power. It should, however, be clearly understood that such sympathy and assistance are extended, not so much to any particular person or any particular party in China, as to the whole nation of China whose greater good we have always at heart.

"It is undoubtedly a tremendous undertaking to establish peace and unity in China. Although that work has not so far made such progress as might be desired, it must not be concluded that the Chinese people are not fully endowed with the gift of character needed for self-government. Such inference seems to us entirely unwarranted. In no case can we accept any plan based on these mistaken premises to place Chinese railways and other administrative organs under international control. We are satisfied that no such project is under contemplation by any foreign government.

"The reports that China may possibly become a communist state, or that she contemplates repudiation of all international commitments which she may deem prejudicial to herself, do not seem to us to be worthy of credence. We shall watch, with hope and tolerance, the efforts of the Chinese people to carry out political reforms so much needed for the country. While fully asserting our legitimate rights and interests in China, we shall give due and sympathetic consideration to the special conditions under which she is laboring, and we shall direct our best attention to the promotion of mutual understanding and co-operation—spiritual, cultural and economic—between the two nations."

There is no mistaking the import of the message conveyed in the above words. It tells the world that the Japan of ten years ago, the Japan of the militarists, the Japan of the twenty-one demands, discarded the mask as soon as its wearing was no longer compulsory. The downfall of imperial Russia terminated for Japan a twenty year nightmare in which at all times she was forced to maintain herself at a high pitch of military efficiency and to be prepared at any moment for the war of revenge that Count Witte frankly confesses was scheduled for 1912. Relieved of this menace and assured of peace in the Pacific by the terms of the four-power treaty, the real Japan reveals herself to the world.

Clear and to the point rings the message that new Japan sends to her fellow-Asiatics across the Yellow Sea. Japan challenges the imputation of inferiority conveyed in the oft-repeated statement that the Chinese people are not equal to the task of self-government and declares her intention to stand by them while they are passing through their hour of trial. With hope and tolerance, with deep sympathy and forbearance, Japan is watching their efforts to establish peace, unity and a stable government. And while they are ordering their national life in their own way, Japan gives them the assurance that no plan that may impair their administrative independence will be accepted or tolerated.

Baron Shidehara's address to the diet is a new declaration of Asiatic independence, one that will take its place in history by the side of the Hay doctrine, a further guarantee made necessary by present conditions, that China's territorial integrity and sovereignty will be respected, no matter what happens. New Japan has spoken.

G. B. R.

"Sauce for the Gander"

International Control of China's Railways

BARON Shidehara's perfect command of English enables him to express in the most restrained and correct diplomatic language, Japan's determination to oppose any plan having for its object international control over the Chinese railway system. Coming at this juncture when *The Times* and other organs of British opinion are strongly urging the application of this remedy to save the railways from complete ruin and guarantee to foreign bondholders the payment of defaulted interest and principal on outstanding loans, the pronouncement of Japan's foreign minister indicates how far the two nations have drifted away from each other on Asiatic policies since the alliance was dropped.

One of the main reasons urged by British sympathizers with China for dissolving the partnership with Japan was the allegation that under cover of its provisions Japan was protected in pushing forward aggressive designs upon China's sovereignty. In fact, the Chinese were encouraged by this reasoning to go still further and assert that *all* of their political woes and misfortunes were traceable to the terms of the alliance. It is well to recall this hysterical outburst when, three years after the disappearance of this

" root cause " of China's evils, Japan's foreign minister declares that no further impairment of China's administrative independence will be tolerated, with pointed reference to the plan for internationalization of her railways. This should provide food for serious thought to those important British interests which now find it necessary to devise some plan to save their investments in China from utter ruin.

The mistakes of the Anglo-American group in China have provided Japan with the opportunity to reinstate herself in the good-will of the Chinese and to stand as their champion, opposing any attempt to force through a program which extends foreign supervision over their principal revenue bureaus by bringing their railways under international control, which by reason of her investments, would hand their administration over to British experts. The mere fact that such a plan is even deemed worthy of discussion would indicate that the full significance of the new trend of Asiatic affairs has not yet been grasped. At a time when China is bent upon regaining her administrative independence through cancellation of unequal treaties, abolition of extraterritoriality and treaty port concessions and other infringements of sovereignty, in which she is openly supported by Russia, it is hopeless to expect that she will view with favor another plan which fastens foreign control for an indefinite period over her most important revenue-producing department.

Western exclusion laws have thrown Japan back upon Asia, giving birth to a fixed national program based on the most intimate relations with China. Co-operating loyally with the other powers in carrying out the provisions of the Washington treaties, Japan places her own vital interests above those of her partners and announces that henceforth she will assent to no plan, program or policy which jeopardizes her legitimate aspirations in China. In this stand she is fortified by her recognition of Russia and although for the present the treaty may convey no menace to other interests in Eastern Asia, it must be accepted as an effective check to an attempt on the part of any other combination to impose their policies upon China. The Anglo-American group four years ago counted Japan out of the race. She has come back in an unassailable position.

This is the answer of Japan to the long-drawn-out propaganda directed against her interests in China, a propaganda which did its utmost to discredit her in the eyes of the world, brought upon her trade a disastrous boycott, invalidated her loans to the Peking government, deprived her of a vital strategical railway right in Inner Mongolia and forced her to surrender Tsingtao together with the Shantung railway and mines. This campaign even went so far as to challenge her position in Manchuria, encouraging the Chinese to denounce the 1915 treaties which assures to Japan for 99 years her lease-hold of the Liaotung peninsula, the key to her economic and strategic security. Had this campaign succeeded in its entirety, Japan's huge investments in China would have been completely wiped out.

The advocates of exclusive Anglo-American co-operation in China have lost sight of the fundamental truth that a preferred position in a foreign country is invariably created through a preponderance of capital investments in the industries of that country. Including the South Manchuria railway, its subsidiaries and other industrial plants in China, the present investment values of these Japanese properties approximates Yen 5,000,000,000, a sum fifteen times greater than the cost of all Chinese railways built through foreign loans.

The bulk of the funds advanced for the construction of China's railways is nominally British but analysis of the loan flotations will reveal that including their equity of £13,520,000 in the Chinese Eastern railways, the French have invested a total of £28,595,000 in the railways of China. The British equity, including a £12,000,000 loan to the South Manchuria railway, stood at £26,620,000 in 1919, but the following year the responsibility for repaying the South Manchuria loan was taken over by the Japanese government, reducing the British equity in Chinese railways to £14,620,000. If the proportion of nominal British bonds subscribed in the Paris market at the time of the issuance of the loans be deduced from this, the British equity would be decreased probably 40 per cent. and the French equity increased proportionately. These figures are important in any discussion leading up to the imposition of foreign control over Chinese railways at this time. When spheres of interest and political preferment are eliminated from such discussions the wishes of the nation having the preponderating capital investment in the country must be given due and sympathetic consideration by other creditors.

On the part of the Japanese there is no hostility to any straightforward business plan that will protect foreign investments in Chinese railways, but there is a well-grounded fear that in return for China's consent to the reorganization of her railways under foreign management the Anglo-American group will encourage and assist the Chinese to regain control over the South Manchuria railway. They do not forget that British and American influence exerted a tremendous pressure to compel them to surrender their rights to the Taonan-Jehol railway and control over the Shantung line and with the new Soviet deal which restores to China joint administrative control over the Chinese Eastern railway, there remains only the Yunnan and South Manchuria lines under exclusive foreign ownership. The Japanese also vividly recall the official report of an American trade commissioner on China's railways in which they were accused of attempting to monopolize all her transportation lines and how Senator Brandagee demanded from the state department that the report be submitted to the senate during the fight in 1919 over the Paris peace treaty, in order to further inflame American public opinon against Japan.

Much water has flowed under the bridges since the signing of the consortium agreement and the Washington treaties. In the interests of peace and good-will, Japan sacrificed every advantage she had gained in China as the result of twenty years of watchful diplomacy and gladly accepted the doctrines which eliminated spheres of interest and guaranteed China's complete administrative independence. In doing so, she suffered heavy financial losses, but she has not whimpered or demanded the repayment of these loans at a time when the funds would tide over a great financial stringency.

Accepting that the British equity in China's railways is now in the neighborhood of £17,000,000 by including defaulted paymentt of interest and principal for the past five or six years, and thas in order to protect this investment, foreign supervision is now deemed essential ; would those who advocate this plan be willing to extend the same concession to Japan and see her take over the supervision of some Chinese revenue bureau as a guarantee for the repayment of her loans ? Would they accept in the same spirit the imposition of Japanese direction over the Kiukiang-Nanchang railway, in default for many years on its obligations to Japanese investors ?

Let us remember that the Japanese took over the Shantung railway from Germany and in six years spent nearly as much as its original cost in improving it. Let us recall that Japan spent many millions in extending the port and city of Tsingtao, converting the fashionable watering place and naval station into an important manufacturing centre, creating work for the people and prosperity for the hinterland. Let us also not forget that Japan was willing to have the old German leasehold of Kiaochow and the port of Tsingtao converted into an international settlement, that she stood ready to internationalize the Shantung railway and mines by handing over their administration to the consortium. Let us remember that Anglo-American official and public opinion would accept no compromise short of full restoration of China's sovereignty over these properties and that Japan smilingly accepted the verdict which destroyed her investments, and got out. Let us recall the pleasing picture of a prosperous Tsingtao and Shantung when the port, railway and mines were administered by Japan and then look at their present condition . . . . and weep. The advocates of international control of China's railways three years ago rejected Japan's plan to safeguard her investments in Shantung. Would they be willing at this time to restore Japanese administrative control over the Shantung railway in exchange for Japan's consent to the internationalization of China's other railways ? Japan's surrender of her position and rights in Shantung are incorporated into a solemn treaty, which cannot be broken. When they find their own interests menaced with complete ruin, have the advocates of the present plan the courage to now propose that the Shantung railway be included in the lines to be brought under international control ?

Japan has sunk nearly Yen 50,000,000 in loans to the Han Yeh Ping Coal and Iron Company and there is little likelihood that the Chinese with their present system of management will ever repay the obligation. Instead of insisting upon taking over control of this premier Chinese industrial enterprise as a guarantee for the repayment of these loans, Japan is now sinking a further

Yen 9,000,000 in order to keep the steel works and mines alive. If conditions on the loan built railways of China are now so deplorable that foreign administration is imperative in order to save them from utter ruin, would those who favor this plan concede Japan's right to control China's iron and steel industry ? In exchange for Japan's acquiescence in the international administration of China's railways would the advocates of this plan be willing to reciprocate and agree to Japanese direction over the Han Yah Ping coal, iron and steel enterprises and to purchase from this Sino-Japanese company the materials required for the reconstruction and equipment of China's railways during the period of foreign control ? This would seem to be a very equitable arrangement if the proposition be considered from a strict business viewpoint. Japan now owns outright about 40 per cent. of all the spindlage of China's cotton mills. In addition she has made many loans to Chinese-owned mills in order to save them from going under. Would the advocates of international railway control view with sympathy the foreclosure by Japanese capitalists on the mortgages covering these Chinese cotton mills and other important industries and mines ?

In any plan for bringing China's railways under foreign administrative control, what is the inducement held out to American interests to assent to such an arrangement ? Would the United States government sacrifice its traditional policy in China in return for a few subordinate jobs in the direction of China's railways ? Outside of the quarter participation in the Hukwang loan amounting to $7,500,000, and a few extra millions owing to American firms for materials supplied to Chinese railways, what motive could be urged in order to obtain America's consent to a plan which places their administration under experts from another country?

What will such an arrangement benefit Japan? What guarantee can the interested parties give to Japan that once an international commission is directing the state railways of China that a campaign will not be initiated for bringing the South Manchuria line under its control ? It goes without saying that once China's railways are brought under the administration of an international commission dominated by Anglo-Americans that its thirst for power would grow as it became more strongly entrenched in authority. It does not require any undue political prescience to look ahead to the day when in order to consolidate its control over all railways in China such a commission would inspire an agitation to deprive Japan of the exclusive direction over the South Manchuria line by challenging the validity of the 1915 treaties. It worked in Shantung. The day may also arrive when Japan may be caught in a position where it would work in Manchuria.

The most successful and most efficiently operated railway in Eastern Asia is under Japanese direction. Its organization includes experts in every branch of railway operation. It employs a body of high-class technical experts for the creation and development of mining and industrial enterprises. They have accomplished wonders in Manchuria and if permitted could duplicate their work in other parts of China. If the proposed plan arises from an honest desire to protect the foreign bondholders, expedite the extension of her transportation system and develop her industries, what objection could there be to the South Manchuria railway authorities, acting as the trustee for these interests ? Remembering that the Japanese hold a mortgage on the Shantung and the Kiangsi railways in China proper and on the Kirin-Changchun and Ssupingkai-Taonan lines in Manchuria, that their banks have advanced large sums to the ministry of communications, would the advocates of the plan be willing to accept Japanese leadership in carrying it out ?

Anglo-American opposition to Japan's activities in China forced the creation of the new consortium, it brought about the Washington conference and the treaty that guarantees to China her administrative independence. Japan paid the price. She accepted the new line-up in world affairs and has lived loyally up to her committments. Conditions have since changed. Anglo-American business interests and investments in China are now being destroyed in the same manner that Japan's investments were formerly imperilled. America and Great Britain fixed the rules of the game at Washington. They posed as the saviors of China receiving due praise and gratitude from the Chinese people for establishing their status amongst the nations. Baron Shidehara diplomatically declares that the pledges made at Washington must be fulfilled. Japan assumes the rôle of China's champion and says in so many words, " What is sauce for the goose is sauce for the gander."

Those Unequal Treaties

Japan Rejects the Idea that China will Repudiate Her Treaties: A Guarantee that Her New Understanding with Russia Does not Clash with Her Washington Committments

DIPLOMATIC speechmaking as a means of giving publicity to a nation's foreign policy is rapidly superceding more formal announcements through regularly constituted official channels. The clear, concise and commendable outline of Japan's program in China announced in Baron Shidehara's speech before the diet followed Minister Schurman's equally forceful presentation of American government's attitude on the abolition of extra-territoriality, acknowledging the right of China to cancel the so-called unequal treaties just as soon as China has established a unified government capable of discharging its obligations.

The message of Minister Schurman provides the opportunity for Mr. Karakhan, the Soviet ambassador to Peking, to take up the discussion where Baron Shidehara and Dr. Schurman left off. In a speech delivered before the Peking National University on January 21, he takes direct issue with the American program of evolution and asks :

" But what does this term really imply ? To repudiate unequal treaties by an evolutionary method means to put one's self at the mercy of those who forced such treaties upon China, it spells waiting, asking, entreating and after all, leaving the cancellation of the treaties, in the hands of those who do not wish to cancel them " . . . America's promise to cancel unequal treaties after the establishment of a strong Chinese government is nothing else than a polite way of refusing to give them up. You may write this down in exactly this sense."

Like all Soviet leaders, Mr. Karakhan has the word " revolution " on the brain spoiling an otherwise enlightening contribution to Far Eastern politics by declaring that the annulment of the unequal treaties can come only through this method.

What would be the consequences to China if the so-called unequal treaties are cancelled without previous arrangement with the other powers ? What nation would dispatch its armed forces to China to uphold and maintain their treaty rights ? Would it be possible to stir up American opinion and congress to the point where they would agree to send an expeditionary force to China for the purpose of defending our extraterritorial rights ? Will Japan modify her new policy towards China by joining in such a movement ? Would Great Britain standing alone, or with France, enter into an adventure of such magnitude without the co-operation of America and Japan ? On the other hand we see Russia standing behind China urging her to take the leap, citing the ease with which Afghanistan established her independence and the victory of Turkey over European imperialism.

" Their example will," he hopes, " lead to the national emancipation of the Chinese people, which knows that far from being the product only of the last years, our policy was formulated in an absolutely precise manner as early as 1919. We feel certain," he adds, " that our policy is uniting with ever stronger bonds the people of the U.S.S.R. and China, mutually strengthening our international position. And I think that not the least role in the struggle which you will carry on with stubbornn ss and self-devotion until you

achieve ultimate victory, will be played in the presence at the frontier of many thousand miles of a reliable and revolutionary brother, a people following your struggle with millions of admiring eyes."

This is a very straightforward admission of Soviet aims in China, leaving no room for doubt as to what is actually transpiring at Peking.

In the past five years China, unconsciuously perhaps, has travelled more than half way along the Soviet road of repudiation of debts and cancellation of treaties. It is true that China has not formally repudiated her debts, but she is not paying them or manifesting any inclination to do so. There seems to be little difference in practice between chronic default and actual repudiation, only in the former there is always a hope that the debt will some day be paid. In like manner, China has not openly denounced any of her treaties, but she has unblushingly ignored their existence and violated them as it suited her whim. Here, also, there seems to be little difference in principle between actual cancellation and deliberate evasion. For all practical purposes China has followed in the foot-steps of Russia and the only inconvenience she has suffered has been the slight extra work entailed upon the Waichiaopu secretaries in filing away in some obscure pigeon hole the voluminous protests of the diplomatic corps at Peking. Is it any wonder that foreigners in China are now forced to sit on the side lines and witness the Soviet prodding the Chinese to make effective what they have been carrying out in practice for the past five years ?

The picture is disquieting. If China takes the plunge, who is responsible ? Does not the responsibility go squarely up to those who initiated, encouraged, organized and directed the anti-Japanese campaign of 1919, 20 and 21 ? Japan was the only check against the spread of Bolshevism in Eastern Asia ; the Anglo-Japanese alliance the one guarantee that Russia would be kept in her place. The pressure of world opinion compelled Japan to withdraw her army from Siberia, surrender vital strategic concessions designed to protect China and herself against the " menace from the direction of Urga," cancel a military alliance with China entered into for the express purpose of checking the advance of the red armies and brought about the abandonment of her alliance with Great Britain. As step by step Japan surrendered her positions, the Soviet advanced until they regained full possession of all rights enjoyed by imperial Russia in 1914. Japan had carefully built up a wall that would have enabled her to effectively keep the Soviet out of China. Anglo-American diplomacy interested primarily in safeguarding China's interests, demolished the wall and left her defenseless. Japan's attempt to stem the tide of Bolshevism in Eastern Asia cost over a billion yen or more than half the profits accrueing to the nation as a result of the great war. An industrial and commercial depression that nicked another big slice out of these war profits was followed by a calamity that in two days destroyed property to the value of Yen 15,000,000,000. Stripped of her power of defense and lacking the funds to maintain her strategic position, Japan found herself unable to further carry the load of checking the advance of Russia in Asia. Faced with this complete breakdown of her program, Japan accepted the inevitable, made the best of a bad bargain and re-established relations with Russia.

Does this mean, as some British and American editors seem to fear, an understanding for mutual co-operation in China against other foreign interests, the formation of a Russo-Chinese-Japanese or Pan-Asiatic bloc ? Mr. Karakhan openly urges the Chinese to denounce the unequal treaties at once, but Baron Shidehara in his speech to the diet declares that the prospect of China becoming a communist state or of repudiating her international committments is not worthy of credence. This official utterance following immediately on the heels of the new Russo-Japanese treaty leaves no room for doubt where Japan stands on this question, an assurance to other foreign interests in China that she will seek no special advantage by co-operating with the Soviet in its plan to destroy their rights. This assurance is amplified and strengthened by a statement given out by Baron Hayashi in London. He says :

" The alleged activities of Soviet agencies attempting to establish a Soviet government in China will fail completely. The Soviet theory of government is absolutely incompatible with all Chinese philosophy and social traditions.

" The Chinese are not a revolutionary people, and yet their most fundamental traditions would have to be overturned before they could accept Soviet and communistic theories of government. So there is no real danger of China being Sovietized.

" There is danger, however, of 'young China'—the student class—becoming inflamed by Soviet propaganda and attempting to destroy the present system, foreign treaties and extraterritorial rights."

These two statements clarifies the atmosphere in regard to Japan's relations with Russia. They align Japan on the side of the other powers favoring the restoration of China's full sovereignty through evolution. The statements also imply that Japan now holds the deciding vote in any program for stabilizing China. Should she, as some people fear, decide to throw in her lot with Russia, the program of the other powers must fail. The success of Anglo-American diplomacy in China would therefore depend on the full and loyal co-operation of Japan, handing over to her the leadership in the solution of China's problems. That Japan is preparing to qualify for this leadership may be sensed from the full statement given out by Baron Hayashi.

Japan's Plan for the Reconstruction of China

Baron Hayashi Says, at the Proper Moment Japan will Take tbe Lead in Calling a Conference to Devise Plans for Reforming China's Finances, Tariff and Railways in which Her Sovereignty will be Fully Safeguarded

IF Japan rejects the British plan for international control over China's railways as the only way to save them from utter ruin and we eliminate the so-called " Dawes plan " originated by Americans what have we left ? How will Japan maintain her leadership in China without a definite program that will appeal to the other powers and at the same time give effect to her new policies towards China ? For a fuller exposition of Japan's policy we must turn once more to the diplomat for enlightenment, and here again we find it fully outlined in an interview given to the United Press by Baron Hayashi, Japan's ambassador at London :

" Japan's policy in China," he said, " is based upon complete and open understanding and co-operation with the great powers. Japan is determined to avoid any intervention in China's affairs, except in the form of friendly assistance offered jointly by Japan, the United States and other great powers.

" In other words, Japan plans no action in China, no interference in Chinese affairs, no act of assistance or move-

ment to tranquillize China, except by concerted action of the great powers.

"I think there must eventually be an offer of assistance to China by the powers," he continued. "This would have to come after a Chinese conference, in which the powers would participate, and no action could be taken unless it were agreeable to China.

"We cannot force assistance upon China. She must be willing to accept it. The present does not seem propitious to attempt such a conference or offer such assistance. When the moment is opportune, and it is known China will accept, Japan will willingly take the initiative if desired—but first the powers and China must have reached a well defined understanding.

"In other words, the conference must not fail. Whenever it is called we must be pretty sure in advance it will succeed.

"Military intervention in China by any or all the powers would be a colossal blunder, in the opinion of Baron Hayashi. It may be necessary, he said, to give local protection to foreign lives and property in an exigency, but anything approaching a military expedition would inflame China and might cause a repetition of the Boxer uprising.

"The form of foreign assistance to China should be financial and advisory," explained the Ambassador. "Foreign advisers, under Chinese direction, would undertake tariff, financial, railroad and like problems."

Baron Hayashi's statement constitutes a very definite promise that Japan is willing to exert all her powerful influence on the Chinese government to consent to the convocation of a new international conference for the purpose of laying down a reconstruction program that will cover tariff, financial, railway and other reforms just as soon as there is a stable government at Peking to deal with. He warns the other powers that the plan must be based on the full recognition of China's sovereignty and that all experts and advisers called in to assist in this reconstruction program must be subordinated to Chinese direction. In other words, international control through commissions or heads of bureaus will not be tolerated.

Baron Hayashi's statement also seems to imply that Japan will take the initiative and do its utmost for the proper protection of other foreign interests in China providing the Chinese be permitted to establish a government at Peking that it can deal with, that is to say, one that is not avowedly anti-Japanese. Here again is seen Japan's answer to the long-drawn-out campaign against her interests. After five heartbreaking years of misery, misrule and ruin following a futile attempt to bolster up an anti-Japanese government at Peking, the political wheel has turned and restored to power the "traitors" who were kicked out because of their friendship for Japan.

Although it may not be said that the present government at Peking is pro-Japanese, it certainly is not anti-Japanese and there is every reason to believe that if Tuan Chi-jui is successful in restoring the central power over the provinces and *tuchuns* that he will accept Japan's offer of mediation and consent to calling the proposed conference. This effectively disposes of all other tentative plans for convoking tariff, railway and financial conferences on the initiative of the nationals of other countries. It will be difficult to dislodge Japan from the leadership she has now assumed and as long as she lives up to her new policy towards China, her position is impregnable.

Dr. Schurman's Speech on Extraterritoriality

A Straight-Forward Statement of American Policy Indicating a Continuance of a Policy of Friendship Toward the Chinese People

ADDRESSING the Anglo-American association in Peking, Dr. Jacob Gould Schurman dealt with the entire question of extraterritoriality with a breadth of vision, an understanding of the aspirations of the Chinese people and an appreciation of the position and interests of the United States in China, unusual in an American minister in Peking. For many of the present difficulties of Americans in China have arisen from a dogmatic policy developed in the American legation when Dr. Reinsch was minister, a policy which on the one hand held out to China hopes which could not be fullfilled and on the other hand instigated the Chinese to distrust and dislike foreign nations, other than the United States. In this differentiation as between one and another foreigner in China lay the germ of distrust and eventual dislike for all foreigners in China, a germ nurtured and cultivated by the younger element of the Chinese who have found in Russia and Turkey emulatory examples.

Dr. Schurman in discussing extraterritoriality attacks the root of Sino-foreign relations. It is not worriment over tariff reforms which causes friction between Chinese and foreigners, but the sense of loss of sovereignty, the presence of foreign controlled, foreign managed, foreign administered areas within China. There is much to say for the foreign point of view that the concessions and settlements are the results of the enterprise and initiative of hardworking, energetic foreigners who for more than half a century have been laboring to turn swamps and bare hills into modern cities, the like of which were never dreamed of in the interior of China. On the other hand, it is fatuous to ingore changes in political tendencies among peoples. We are living in an era of intensive nationalism. Among all the peoples of the universe this insistence upon nationalism, upon the right of those who are of one kind to work out their own salvation in their own way, unhampered by the co-operation or even the advice of those nations which have been more successful in the historical struggle for power, is constantly becoming more and more accentuated. No matter how unfavorable internal conditions in China may be, the Chinese apparently prefer what they have, to what they might get through foreign co-operation. This fact, Dr. Schurman senses keenly when he says:

"The great majority of foreign business men in the treaty ports have no idea how sensitive Chinese have become on this subject. Only a small number of them whose business ramifies throughout the vast interior of China are brought by experience into actual contact with the growing sentiment of nationality among the Chinese people. This is why foreigners in the treaty ports are so conservative whenever any revision of the treaties is proposed which involves a fuller recognition of Chinese sovereignty. On the other hand, missionaries, who live in the interior, certainly American missionaries, in spite of many miscarriages of justice which take place under their very eyes, generally sympathize with the aspiration of the Chinese people, which seems to them a perfectly natural one, for the recovery of full judicial sovereignty within their own territories. But, as I have said, the conservative tradition of the treaty ports is averse to modifying the present system of extraterritoriality and indeed deprecates all discussion of it. It is an extreme position and with the lapse of time will in my opinion become more and more untenable."

The inability of the average foreign business man in China to understand political conditions in China, to read beyond the bare headlines of the newpapers published in treaty ports, is evident from the resolutions passed at the annual meeting of the associated American chambers of commerce in China which met fully a week after Dr. Schurman's address was published in the newspapers and which had ample opportunity to consider the necessity of the American merchant in China not acting in opposition to the expressed sentiments of the American government as pronounced by the officially accredited American representative to this country. According to the newspaper accounts of the resolutions passed at this annual meeting, was one recommending to the American government that no action be taken toward the appointment of delegates to the special tariff conference or the commission to investigate the status of extraterritoriality until conditions in China have become stabilized and a government has been established which is able to exercise constitutional authority throughout the land.

The shortsightedness of the resolution lies not in the reactionary character of the merchants' objection to all and any changes of status, as though any political or social relationships could be of a permanent character, but in the fact that they oppose even the appointment of a commission to investigate into the possibility, the desirability, the advantages or disadvantages of change. Surely such resolutions can only lead Chinese to believe that the American merchants fear that should impartial Americans, fresh to the situation, study it, they would immediately conclude that extraterritoriality should forthwith be abolished.

Actions such as these influence Chinese to adopt tactics which give the appearance of revolutionary activity. Dr. Schurman perhaps over-emphasized the importance of Mr. Karakhan or his government in their influence upon the younger generation of China. The revolutionary movement in China commenced many years before Russia knew the Soviet, many years perhaps before Mr. Karakhan was born. The T'aiping rebellion and its effects upon the Manchu court introduced a revolution in governmental ideas and methods in China, the effects of which are just beginning to appear in the popular movements of contemporary China. Mr. Karakhan's policy of repudiation of treaties and agreements was in the background of Chinese diplomacy before Mr. Karakhan came to the country and in effect, has been practiced in many respects, particularly as regards taxation and the non-payments of debts. The difference between the Chinese and the Russian is a difference in training and temperament. The Russian repudiates his treaties in a loud-mouthed, blatant manner, after the fashion of a street orator haranguing a crowd. The Chinese politically does nothing and says less, but the effect is exactly the same. The treaties are in many respects unenforcable and there is no one to gainsay China at this moment. When Lu Yung-hsiang, the bepraised *tupan* of Kiangsu, instituted the tobacco tax in Chekiang province, which he then governed, and when the central government admitted its impotence in preventing him from breaking the treaties between China and the foreign powers, China did very much what Mr. Karakhan advised when he suggested that treaties be repudiated.

Of course, the Chinese in the Waichiaopu having had a longer experience in diplomacy than those who now govern Russia, a wiser course will in the end be taken. Dr. Schurman suggests that that be :

> I hasten, therefore, to point out a more excellent way. It is not reactionary like the first but progressive. It is not revolutionary like the second but evolutionary. It tends to promote not distrust and hatred but confidence and good will and friendship. It involves not single-handed and arbitary action on the part either of China or of the treaty powers but the co-operation of both and the conciliation of each and only such a medium of compromise as wise and practical negotiators dealing with great and conflicting interests are always ready to make."

The evolutionary, progressive method has many advantages to China, as it has for the foreign powers. The internal political situation of China is such that it would undoubtedly give the Chinese government much less work to do, if, whatever steps are taken to abolish extraterritoriality, do not have a direct bearing upon that situation. No foreign power is willingly going to give up her rights in China unless the Chinese government devises some method to take over such rights in a manner which will conform to the basis laid down by Dr. Schurman :

> "The first is that foreigners in China must continue to be assured of justice as measured by western standards. The second is that with every step in the abandonment of extraterritorial jurisdiction, with the surrender of each successive element of it, a just, practical and effective substitute must be found to take the place and discharge the functions of each factor eliminated. If extraterritoriality is to be abolished there must be developed a Chinese judicial system and practice which will assure to the foreigner clean and even-handed justice."

To accomplish this task China must have time and the intelligent co-operation of the powers, a co-operation which is not forced, not co-operation which is in effect an impediment, not co-operation which leads to hatreds, but a co-operation based on a principle that both sides want success to crown the efforts, that both sides fully believe that the work undertaken is in the best interests of all parties concerned. Dr. Schurman seems to favor a plan which he discussed at some length in his address :

> ' Now there seems to be a simple way of preventing this miscarriage of justice and clearing up this judicial confusion while conserving the rights of all parties concerned. The remedy was suggested in 1919 by Mr. Woodhead, the Editor of the *Peking and Tientsin Times*. It is that so long as there are foreign courts in China they shall at least all administer the same law—the law of the new Chinese codes. It would of course be necessary that these codes should have been examined and, with or without amendment, adopted by the treaty powers. This might be one of the duties of the commission provided for by the Washington conference to investigate the subject of extraterritoriality."

This plan has been discussed by jurists and others interested in the reorganization of China's courts and her judicial procedure, not only from the standpoint of finding a legalistic system which will approximate the jurisprudence of the west, so that foreigners might with some safety live under the codes of China, but also with a view to providing the Chinese people with a more equitable system of law. Dr. Tung Kang, at one time minister of justice and at another chief justice of the supreme court of China, after a visit to European and American courts, suggested that one of the supreme weaknesses of the modernized jurisprudence of China lies in the fact that the new codes have been taken largely from continental European codes via Japan rather than from the Anglo-Saxon legal system, which he believes comes closer to the ancient Chinese traditional ideas of equity. But it makes little difference what codes are adopted, since the benefits of law to the litigant lie not so much in interpretation as in the procedure of the court and the general construction of the law. In Anglo-Saxon countries, the construction of the law, follows age long precedents originating in English common law and developing through a line of decisions by learned judges. This adherence to precedent, to the written word, has made the courts of England the model of the modern world.

The creation of such a body of precedents, the lifting of the court out of the muck of politics, the creation of a popular respect for its decisions and a confidence in its wisdom, is not a work of a day. The decisions of Chinese magistrates, the diaries of taotais and Shaohsing lawyers, the aphorisms of scholars and sages, present such a body of precedents, but these have not been formulated into anything approximating the body of English law, although they apply for a larger number of human beings. Nor have they been adapted to modern legal procedure nor to current affairs. There has been no Bracton, Coke or Blackstone in China, although the belief of many foreigners that there have been no great legal minds in China is altogether without foundation.

The emphasis on courts in this article and in all discussions of the problem of abolition of extraterritoriality arises from the fact that as life and affairs are organized under the present economic and social system, security and continuity depends upon the law and its administration through court decisions. Paternalism and the individualistic wisdom of the chosen few satisfied medieval conditions, but corporate enterprises and the intricacies of property-ownership require that men shall have some idea of the legal stutus of a proposition before the event, that is, before the law is broken and the property endangered by the possibility of an adverse decision. There has to be a sense of security that in following the spirit and the letter of the law, there will be no jeopardy to property due to whimsicalities on the part of an individual jurist. The courts, ancient or modernized, now existing in China, offer no such security.

In the mixed court of Shanghai, China has the opportunity of creating an experimental court and a training school for jurists as well as an institution for the building up of a body of precedents such as has been developed in Anglo-Saxon countries. It is in this court that China and the foreigners in China have their most intimate point of contact, where daily questions of law and equity arise as between Chinese and foreigners, involving huge properties and the keenest questions of life and liberty, and where there has to be an adjustment between the law of China and the laws of every country having foreigners in China, and the customs and traditions of China and the customs and traditions of every country having foreigners in China. It is in the mixed court of Shanghai where East meets West and where the two must adjust their different viewpoint.

This court, as at present administered, is unsatisfactory both to Chinese and foreigners. The Chinese magistrates are not officials of the Chinese government nor are they trained jurists. They do not command the respect of either the old-style lawyers of China nor of the modern Chinese lawyers trained in European and American universities. The foreign assessors are usually young consular officers, often without any legal training, surely with no outstanding legal experience, whose decisions are too often rendered along the lines of national policy and consular suggestions, than on the broad basis of fundamental law. Such a court can nowhere command popular respect nor can its decisions have any weight among jurists in other courts. As a matter of fact, the supreme court of China has decided that the decisions of the mixed court of Shanghai, have no weight in the eyes of that court and that its decisions are not binding outside its immediate jurisdiction.

But were China and the foreign powers enjoying extraterritoriality to unite on a plan to appoint to this court as judges the best legal minds in China and as advisory judges or assessors the best legal minds available in countries having rights in that court, or better still, were China given the opportunity to select from the various countries the foreign advisory judges, this court would command the respect and its decisions would obtain the recognition of other courts throughout China. It would then become the leader in jurisprudence, the legal training school whence would come magistrates for the whole country. It is impossible for this article to discuss such a plan in detail, nor does its author, who is not a lawyer, feel competent to lay down the law for lawyers to follow, but the suggestion is made because the next time the question of the rendition of the mixed court arises between China and the treaty powers, it might be dealt with not as an individual problem nor on the narrow lines that nothing may change in China, but on the broader lines that changes there must be, that extraterritoriality must eventually be abolished and that a good place to begin the experiment is in this court.

The Russo-Japanese Agreement

A New Epoch in the Far Eastern Affairs Opens in Which Japan, China and Russia Are Associated for the Peace of the Pacific

The Saghalien Oil Concession Strengthens Japan's Navy

THE Russo-Japanese agreement signed at Peking by Mr. Karakhan, the Russian ambassador, and Mr. Yoshizawa, the Japanese minister, marks a new period in Far Eastern diplomacy. It will be remembered that when the Soviet régime began to make its policies felt in the Far East, it was Japan which undertook to establish a barrier against its advance into China. The associated powers immediately joined Japan in the Siberian campaign with a view toward preventing the permanent occupation of that country by a Japanese army, although Japan had expressed no intention of taking such a step. It was a time of suspicion in the United States and Great Britain of everything Japanese. It was a time when the anti-Japanese movement in China was at its height, when the British and American legations in Peking were exercising themselves over the political possibilities of the Nishihara loans, when every American journalist and many missionaries appointed themselves agents of the American secret service to ferret out incriminating information against a nation with which the United States was at peace and with which the United States was actually engaged in a joint military enterprise.

Nothing good could possibly come out of an enterprise which was conceived hysterically and conducted fulsomely. The ostensible reason, assistance rendered to a Czech army to free itself from bondage, having fulfilled itself, the armies of the western powers withdrew and it was expected that the Japanese army would also immediately withdraw, leaving the field to various disturbing " White " Russian factors operating in Siberia, Mongolia and, if the truth must be told, Manchuria. Japan, however, remained for some time, principally because Siberia not only is in close propinquity with Japanese territory (Korea), but because Japan has a special interest in the peace and order of Manchuria. During the fighting between the foreign troops and the Russians, an event occurred at Nicholaievsk which wounded every finer sentiment of the Japanese people. Japanese were massacred and the Japanese dead were mutilated.

Among eastern peoples, the dead command a special position. The system of ancester worship which is the keynote of Eastern Asian religions, requires that the body of the dead shall in no way be multilated, that every effort shall be made to provide a suitable burial, and that reverence be shown the corpse. In many respects this is true in most western countries, but in the East, such matters find an accentuation unknown elsewhere. Because of the Nicholaievsk occurrence, Japan seized and militarily occupied the Russian portion of the island of Saghalien. The occupation of this island and Japanese activities in the vicinity of Vladivostok engendered bad blood between Russia and Japan until finally the Japanese expeditionary force to Siberia was recalled.

Russian diplomatic policy in the Far East was first premised upon a union with China against Japan and perhaps the Anglo-Saxon countries. Mr. Yourin was sent to China to effect a peace agreement with the two countries. In public statements and through the Russian press organization founded in China, Soviet Russia offered China such startlingly good terms that it was surprising that China did not immediately accept. But the terms frightened the western powers even more than they did Japan. Whereas at the beginning of Mr. Yourin's visit to China, he met with a certain support from the hidden, perhaps self-appointed, Anglo-American agencies, he soon found himself attacked on all sides because it was felt by all foreigners in China, that his terms were designed to instigate China to an attack on the western powers. The automatic surrender of extraterritoriality, of concessions, of vested rights, was part of the propaganda period of the Russian Revolution. Mr. Yourin's efforts were directed toward affecting the western powers and Japan rather than the Chinese people, who turned a cold shoulder to him and to his offer.

Mr. Yourin's failure to accomplish anything in China resulted in his recall and Mr. Joffe was sent to China. Mr. Joffe was a man of outstanding diplomatic calibre. He had participated in the conferences which led to the signing of the Brest-Litovsk treaties and had assisted in the creation of the Soviet policy of finding recognition among the powers which had refused to recognize Soviet Russia. He was not in the Far East long before he determined that the hub of the situation was Japan and that unless Japan and Soviet Russia came to an understanding, the diplomatic efforts of Soviet Russia would be nullified. Because, he must have learned what every one with an understanding of Far Eastern affairs knows, that Japan and China are so closely bound together in Manchuria that China would think twice before sacrificing Japan's friendship and co-operation for the uncertainty of friendship and co-operation with Russia, at a time when Japan and Russia were not on speaking terms. Mr. Joffe thereupon set out to win the good-will of Japan and succeeded in building up a group in Japan friendly to Russia and headed by Viscount Gotc. This group invited Mr. Joffe to visit Japan and it appeared for a while that an agreement would be consumated. Mr. Joffe was suffering from neuritis and spent much of his time in bed. It was difficult for him to accomplish very much under such circumstances, although to him must go the credit for having begun a work which has finally succeeded.

Mr. Karakhan and Mr. Yoshizawa commenced their discussions soon after the Russian ambassador's arrival in China. These discussions were simultaneous with Mr. Karakhan's conferences with Dr. C. T. Wang regarding a preliminary agreement between China and Russia and each must have influenced the other. Mr. Karakhan was present at both conferences and Dr. Wang was a particularly suitable person for China's purposes because of his breadth of view and his friendship for both Japan and Russia. It will be recalled that Dr. Wang's conferences ended in failure because of a palace intrigue in Peking, certain politicians seeking to withhold from him the credit of a great accomplishment. Subsequently, Dr. Wellington Koo signed a preliminary agreement with Mr. Karakhan practically identical with that which Dr. Wang had arranged.

Altogether seventy-seven formal sessions were held by the Japanese-Russian delegates, in addition to which a large number of informal meetings took place. These meetings for a time being simultaneous with the Sino-Russian conferences undoubtedly, we repeat, resulted in a situation wherein one influenced the other. It was at the time suggested that a Tripartite Conference take place at which China, Japan and Russia might settle their outstanding differences together, thus forming a North Pacific understanding. But this suggestion was not taken seriously, probably because of the international position of China and the fact that the western powers would have viewed such a situation with the usual alarm.

The treaty which was finally signed on January 21, is important because it ends a situation in the Far East which always included the possibility of war between Japan and Russia, which war would have been fought on Chinese soil, Manchuria. Thus, is China, Japan and Russia freed from a spectre. That the earthquake had something to do with the consumation of the agreement cannot be denied. Japan once was ready to keep Sovit Russia out of Asia. Japan was once prepared to save the western powers from the effects of Soviet propaganda in China. Japan invested a huge fortune in such an enterprise in Siberia, and for this investment Japan naturally expected a reward. But the western powers utilized the full strength of their diplomacy to prevent Japan from accomplishing her purpose. To-day they are faced with the fact that whereas the United States and Great Britain have not come to an understanding with Russia, whereas the governing classes of both countries are in a white funk over the Russian question, Japan has come to a satisfactory arrangement with Russia and is already preparing to trade with that country.

Meanwhile, Russia is declaring herself ready to become the ally and protector of China against the western powers and is encouraging China to free herself from the unequal treaties between herself and the western powers by revolutionary means, while Japan has declared a Monroe Doctrine as regards her relations with China, as is recorded elsewhere in this issue. Thus has the Anglo-American policy in the Far East failed and it has failed largely because of the suspicion of Japan, unwillingness to co-operate with Japan, unwillingness to understand Japan. Japan, China and Russia are being thrown together, not only because of their geographic and political relationships, but because Anglo-Saxon diplomacy has indicated to them that their national aims are co-terminus.

The basic agreement between Russia and Japan in the second article states :

> The Soviet government recognizes as complete as complete and effective the Portsmouth treaty signed September 5, 1905, but reserves the right of either revising or nullifying, as occasion may require, all other agreements, concluded between the high contracting powers prior to November 7, 1917. The maintenance or revision of such agreements shall be discussed whenever occasion requires in future negotiations.

In Note 3, annexed to the treaty, Soviet Russia makes a reservation in which it provides that it is not responsible, politically, for the conclusion of the Portsmouth treaty. The date, November 7, 1917, sets the period after which Soviet Russia assumes responsibility for Russian affairs.

The full intent of the reservation or the explanation of its import has not been made public. It is, however, necessary to call attention to two treaties between Russia and Japan which were signed after the Portsmouth agreement and prior to November 7, 1917. The first was a political convention dated July 30, 1907, and contains the following provisions :—

> Art. I.*—Each of the high contracting parties engages to respect the actual territorial integrity of the other, and all the rights accruing to one and the other party from the treaties, conventions and contracts in force between them and China, copies of which have been exchanged between the contracting parties (in so far as these rights are not incompatible with the principle of equal opportunity), from the treaty signed at Portsmouth on September 5 (August 23), 1905, as well as from the special conventions concluded between Japan and Russia.
>
> Art. II.—The two high contracting parties recognize the independence and the territorial integrity of the empire of China and the principle of equal opportunity in whatever concerns the commerce and industry of all nations in that empire, and engage to sustain and defend the maintenance of the status quo and respect for this principle by all the Pacific means within their reach.

The second is an agreement with regard to Manchuria dated July 4, 1910† and containing the following provisions :—

> The imperial government of Russia and the imperial government of Japan sincerely attached to the principles established by the convention concluded between them July 17-30, 1907, and desiring to develop the results of that convention with a view to the consolidation of peace in the Far East, have agreed to complete the said arrangement by the following agreements :—
>
> Art. I.—For the purpose of facilitating the communications and developing the commerce of the nations, the two high contracting parties engage mutually to lend each other their friendly co-operation with a view to the improvement of their respective lines of railroad in Manchuria, and to the perfecting of the connecting service of the said railways, and to refrain all competition unfavorable to the attainment of this result.
>
> Art. II.—Each of the high contracting parties engages to maintain and to respect the *status quo* in Manchuria as it results from all the treaties, conventions or other arrangements hitherto concluded, either between Russia and Japan or between these two powers and China. Copies of the aforesaid arrangements have been exchanged between Russia and Japan.
>
> Art. III.—In case any event of such a nature as to menace the above-mentioned *status quo* should be brought about, the two high contracting parties will in each instance enter into communication with each other, for the purpose of agreeing upon the measures that they may judge it necessary to take for the maintenance of the said *status quo*.

From the signing of the Portsmouth treaty until the great war, Russia and Japan were coming closer and closer together. It is not to be assumed altogether that this understanding was a relationship engendered by the curious diplomatic situation arising from the triple entente and the Anglo-Japanese alliance. The Russo-Japanese entente was independent of these and was based upon the ideal that the northern Pacific peoples must work out a program for co-operation in the Pacific independent of North Atlantic diplomacy.

After the great war commenced these two powers entered into an alliance the terms of which are as firm as any alliance that ever was made. In the treaty signed on July 3, 1916, the two powers agreed :

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* **Macmurray 1907/11.**

† **Macmurray 1910/1.**

> Russia will not be a party to any arrangement or political combination directed against Japan.
>
> Japan will not be a party to any arrangement or political combination directed against Russia.

The treaty further provided that in the event of any such combination threatening either of the parties, both would confer with regard to measures to be taken mutually to protect each other's interests. In addition to these treaties, reports exist of two so-called secret treaties, the terms of which may or may not be correct. One was published in the *New York Evening Post* on March 2, 1918 and is taken from the files of the Russian foreign office when the Soviet government published its secret archives. This document refers to secret agreements in 1907, 1910 and 1912 and supplements them by a complete defensive and offensive alliance. The second is published in Dr. E. T. Williams' book, " China, Yesterday and To-day," and purports to be a summary of the clauses of the secret treaties delineating the Russian and Japanese spheres of influence in Manchuria and Mongolia. On a map appended to this book, a red line is drawn indicating the boundaries of the spheres.

Dr. Williams ought to know what he is talking about and the Bolshevik government, it must be assumed, did not manufacture secret documents but published what they found. The implication of all these documents is therefore that from Portsmouth to November 7, 1917 Russia and Japan had come so close to each other that they were in actual alliance. This policy was interrupted by the Russian revolution which naturally did not fill Japan with joy since it brought political and economic disturbances to her frontiers. But some seven years have passed since that event and the time has apparently come for these two nations to re-establish their friendly relations, perhaps one might surmise to take up these relations where they were left off. The cancellation of the spheres of influence in Manchuria and Mongolia implied in the new treaty is in accordance with the new dispensation devised at Versailles and Washington, but other features of the previous Russo-Japanese amity need not be and apparently are not, nullified or revised.

Now, it is the permanent diplomatic policy of China to disregard spheres of influence and to arrange for the discontinuance of the practice of marking out such spheres in China. Furthermore, at both the Versailles and Washington conference, the implication was that the spheres no longer exist. The consortium was organized to end all spheres of influence so far as financial matters are concerned. Russia has stated that she is no longer interested in this phase of diplomacy, while Japan has shown every indication of a policy of assisting China to place herself on a fully independent basis. These provisions in the new Russo-Japanese treaty, are a diplomatic victory for China, in that two nations automatically achieve for her what she herself has been unable to achieve.

Two other provisions of the new treaty are of the greatest importance. The provisions with regard to Saghalien end forever the major differences between Japan and Soviet Russia which were based on the Nicholaievsk incident and the occupation by Japan of the Russian portion of the island. The terms of the treaty are as follows :

The two high contracting parties undertake to open further negotiations as soon as the treaty takes effect, and have concluded the following items as basix principles, in accordance with which an agreement will be entered into within the next six months concerning the question of rights :—

(1) The government of the Union of Socialist Soviet Republics undertakes to accord any Japanese firm to be recommended by the Japanese government the right of operating 50 per cent. of the total area of oil-fields in North Saghalien. In order to fix the area of oil-fields to be leased to such Japanese firm, all the fields there are to be divided into the shape of squares as on a checkerboard, an area to the extent of its 50 per cent. is to be leased to Japanese, but these squares, in principle, will not be so placed as to come in contact with each other. All those oil-wells which are now either being operated or are about to be operated by Japanese, are included in the squares referred to above. In case the Soviet government intends to lease to foreign people or firms the area of oil-fields, which is not included in the said squares Japanese firms are to be accorded an equal opportunity.

(2) The government of the Union of Socialist Soviet Republics agrees to accord any Japanese firm or firms to be recommended by the Japanese government the right of prospecting an area to the extent of 1,000 Russian square miles, to be selected, on the eastern coast of North Saghalien within one year after the conclusion of an agreement on the question of rights. In the event of oil-fields being laid out as a result of the prospecting in question, the Japanese firms concerned are to be accorded the right of working an area equivalent to 50 per cent. of the said oil-fields.

(3) The government of the Union of Socialist Soviet Republics agrees to grant any Japanese firms to be recommended by the Japanese government the right of working coal-fields which exist within a special area on the western coast of North Saghalien to be provided in the agreement on the question of rights. In case the coal-fields, other than those to be included in the special area, which is to be leased to Japanese firms, are to be offered to foreign management by the government of the Union of Soviet Republics Japanese firms shall be accorded an equal opportunity.

(4) The term of the leasehold of the oil and coal-fields as provided in the foregoing clauses shall be from 40 to 50 years.

(5) The Japanese leaseholders shall pay as reward to the government of the union of socialist Soviet republics 5 to 8 per cent. of the total output of coal and 5 to 15 per cent. of the total output of oil per annum, but the reward to be paid for eruptive oil-wells can be increased up to 45 per cent. of the total output of oil from those wells. The ratio of outputs to be handed as reward to the Soviet government by the foregoing method is to be provided in the agreement of rights and may be changed according to the quantities of annual outputs.

(6) The Japanese will be permitted to cut down trees required for their enterprises as well as to make various equipments for the purpose of facilitating traffic and transportation of raw materials and products. Details in this connection are to be provided in the agreement of rights.

(7) No taxes shall be imposed upon the imports and exports of materials or articles necessary for the Japanese enterprises abovementioned, and of those which may accrue from such enterprises, in view of the reward in question and of the geographical positions and other general conditions in the districts concerned. Enterprises to be undertaken by Japanese firms shall be immune from such exhorbitant taxes as would render the business impossible to continue.

(8) The government of the Union of Socialist Soviet Republics agree to accord every reasonable protection and facility to the enterprises referred to above.

The Japanese troops are to be withdrawn from the island, while Japanese enterprises exploit the island economically. The political effects of the agreement are that Japan will have available a huge oil supply sufficient to free her navy from the necessity of purchase from abroad. At the same time, American firms which had an interest in the Saghalien situation because of the arrangements between the Soviet government and the Sinclair Oil Company can in no way interfere with the arrangements, since neither the American government nor the Russian government can be bound by the Sinclair agreement which was made in spite of the fact that Russia and the United States did not recognize each other. Besides, the Sinclair concession lapsed in time and therefore lost validity. The Saghalien agreement is the most important economic factor in the new treaty and is bound to have widespread international effects.

In passing, it is interesting to note that Japanese will be permitted to engage in enterprises involving the employment of private capital and that Japanese and Russians will be permitted to own property in either country. A bill has already been introduced in the Japanese Diet to make legally effective these provisions of the treaty. When this bill is passed, it is understood that it will contain provisions granting the right to foreigners to own property in Japan for whatever purpose if and when Japanese may own property in the country from which the foreigners come. In other words, property ownership must be reciprocal. The United States will have to consider this phase of the agreement from the standpoint of those western states which continue to antagonize the Japanese people by anti-Japanese legislation; particularly with regard to land ownership. Russia and Japan, both of which discriminated with regard to land-ownership by foreigners, has now adopted a more liberal policy. What will the United States do to meet these changing conditions not only as regards Russia, but a regards Japan and China ? What will the United States do to win the goodwill of three countriesb ordering on the Pacific whose people number 600,000,000? Can a policy ignore which ignores the new orientation on the Pacific ?

A Pioneer of Sino-Japanese Co-operation

Baron Kihachiro Okura

WITHOUT detracting from the important part played by the present and past liberal cabinets in bringing about such a remarkable improvement in the relations between Japan and China it is to the heads of big business in Japan that credit is mainly due for the impulse which compelled such a radical modification of the old military program. The Iwasakis, the Mitsuis, the Sumitomos, the Matsukatas, the Kuharas, the banking interests headed by Baron Shibusawa and Junnosuke Inouye, the chiefs of the great textile industry and others prominent in the commercial life of the empire were the driving force behind the movement which restored to Japan the full confidence and trust of the other powers. In this group stands the venerable founder of the house of Okura, an ardent advocate of Sino-Japanese friendship and co-operation, who after a life time of activity is now retiring to give his last years to the advancement of his pet hobby.

In October last, this pioneer of Japan's foreign trade, celebrated simultaneously his eighty-eighth birthday, his golden wedding and his retirement from business. After seventy years of business activity he finally decided it was time to hand over direction of his many enterprises to his son and devote his remaining years to the promotion of peace and cordial relations between his own country and the nation to which it owes so much of its culture and civilization. To celebrate the occasion fittingly and reciprocate in part the tokens of esteem received from his many Chinese admirers, this exceedingly rich man determined to spend a million and a half yen in a series of banquets and fêtes that would convey his last greetings to old friends and business associates whose good-will and good-fellowship had contributed so largely to his success in life.

In China, in America, in Europe, in other parts of Asia and in his own country, his personal friends, business associates, co-directors, shareholders and employees in his many enterprises were numbered by the thousand. The recipients of his benefactions were legion. That such a man should celebrate his retirement from active life by some testimonial of regard for this host of loyal friends and adherents may seem theatrical to the Occidental, but the sentiment behind it is so unusual and inspiring, so worthy of emulation by multi-millionaires in other countries as to command more than a passing notice. Whoever heard of an American or European financial magnate celebrating his retirement from business by a series of splendid entertainments to those who had contributed to make his life a success ?

Baron Kihachiro Okura, head of the great commercial house which bears his name. An ardent advocate of Sino-Japanese co-operation who at the advanced age of 88 declares his intention to devote his remaining years to the promotion of closer relations between the two countries

Had this old man been a miser, a slave-driver of his men or devoid of public spirit, we could better understand the protests made by the Tokyo radicals against the expenditure of this large sum for such purposes. But Baron Kihachiro Okura, a name entwined with the development of modern business and industry in Japan and China, has given freely and spontaneously of his riches for philanthropic purposes.

On the bluff at Akasaka overlooking the city of Tokyo stands one of the finest museums in the world housing the rarest and most precious specimens of the art of Japan, of China, of Korea and of India, a veritable treasure-house of the best works of ancient and

(Continued on page 64).

Panoramic View of the Penchihu Blast Furnaces and Principal Coal Workings

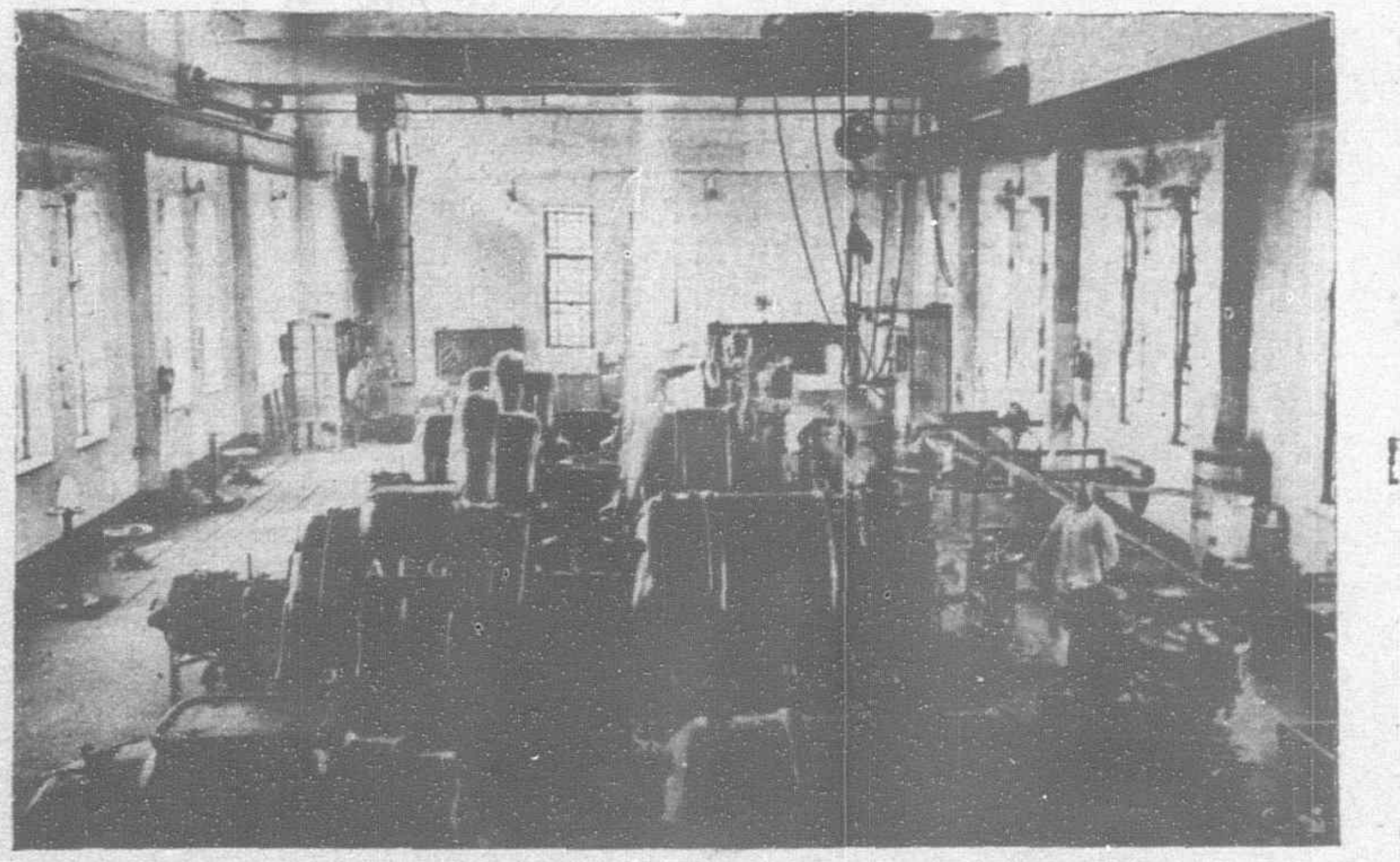
PENCHIHU

A Sino-Japanese Co-operative Enterprise in Manchuria Organized and Developed

by Baron K. Okura

FOR centuries before they were welded into a nation, the Manchu tribes burrowed into the hills of Miaoehrkau for the ore which supplied them with iron for their arms, implements and utensils, smelting it with the coal and limestone dug from the outcrops at Penchihu, six miles distant. It is on record that sometime during the reign of the Emperor Chien Lung an imperial decree was issued conceding to the people of that region the right to operate the Penchihu workings on the payment of a stipulated royalty to the imperial treasury. Coke burned from Penchihu coal and iron ore brought from Miaoehrkau formed the basis of a crude industry whose product found a ready market throughout the Three Eastern Provinces and Korea. For a long period the Penchihu district prospered in its enjoyment of a quasi-monopoly in the supply of iron to Manchuria and North China and it was not until the latter part of the last century that circumstances arose compelling a departure from the ancient methods of mining and smelting.

At this time, the main shaft of the Penchihu coal workings became flooded to an extent that the old hand power pumps and antiquated methods of raising water could no longer cope with the inflow. On top of this disaster, large quantities of foreign iron and iron ware were imported into China at prices prohibiting native competition. The Hunghutzes put the finishing touches to the tale of woe by raiding the town and driving away the inhabitants. Then came the Russians exploring the region followed by the Russo-Japanese war bringing the district within the zone of active military operations and terminating an industry which its crude way had provided the province with coal and iron for many centuries.



Turbo-Blowing Engines for Blast Furnaces at Penchihu

The real story of Penchihu dates from this time. Baron K. Okura, head of the house which bears his name, and one of the most successful contractors to the Japanese army, was with the forces in Manchuria and grasped the great possibilities for an iron and steel industry presented by the close proximity of a high grade ore to excellent coking coal and limestone deposits. Okura did not wait for the termination of the war to push forward his plans but applied at once to the Japanese military authorities at Liaoyang for the mining rights to these properties. Permission to commence operations was granted the following month (November 1905), and active work started in January, 1906.

The Chinese authorities, however, were closely watching the Japanese activities and as soon as the war terminated, entered a formal protest against the validity of a concession granted by the Japanese military authorities. They realized, however, the hopelessness of completely ousting the Japanese and proposed to place the coal mine under joint Sino-Japanese ownership. After three years of negotiation between Baron Okura and Viceroy Hsi Liang, a deal was effected which brought the coal properties under the Penchihu Colliery Company, organized in January 1911 with a capital of $2,000,000 half Chinese and half Japanese. The agreement, however, covered only the coal mining rights at Penchihu. Baron Okura had set his heart on establishing the larger enterprise and suggested to the Chinese that the iron mines at Miaoehrkau should also be brought under control of the company. On October 6, 1911, a new agreement was, therefore, entered into for the acquisition of the iron deposits and the erection of a blast furnace at Penchihu and the name of the company changed to The Penchihu Coal and Iron Mining Company. The capital was increased to $4,000,000, shared equally by Chinese and Japanese. In March, 1913, this was again increased to $7,000,000, where it now stands. The success attending this initial co-operative Sino-Japanese undertaking paved the way for many other similar enterprises which have brought prosperity to the Chinese in Manchuria.

Location of Mines

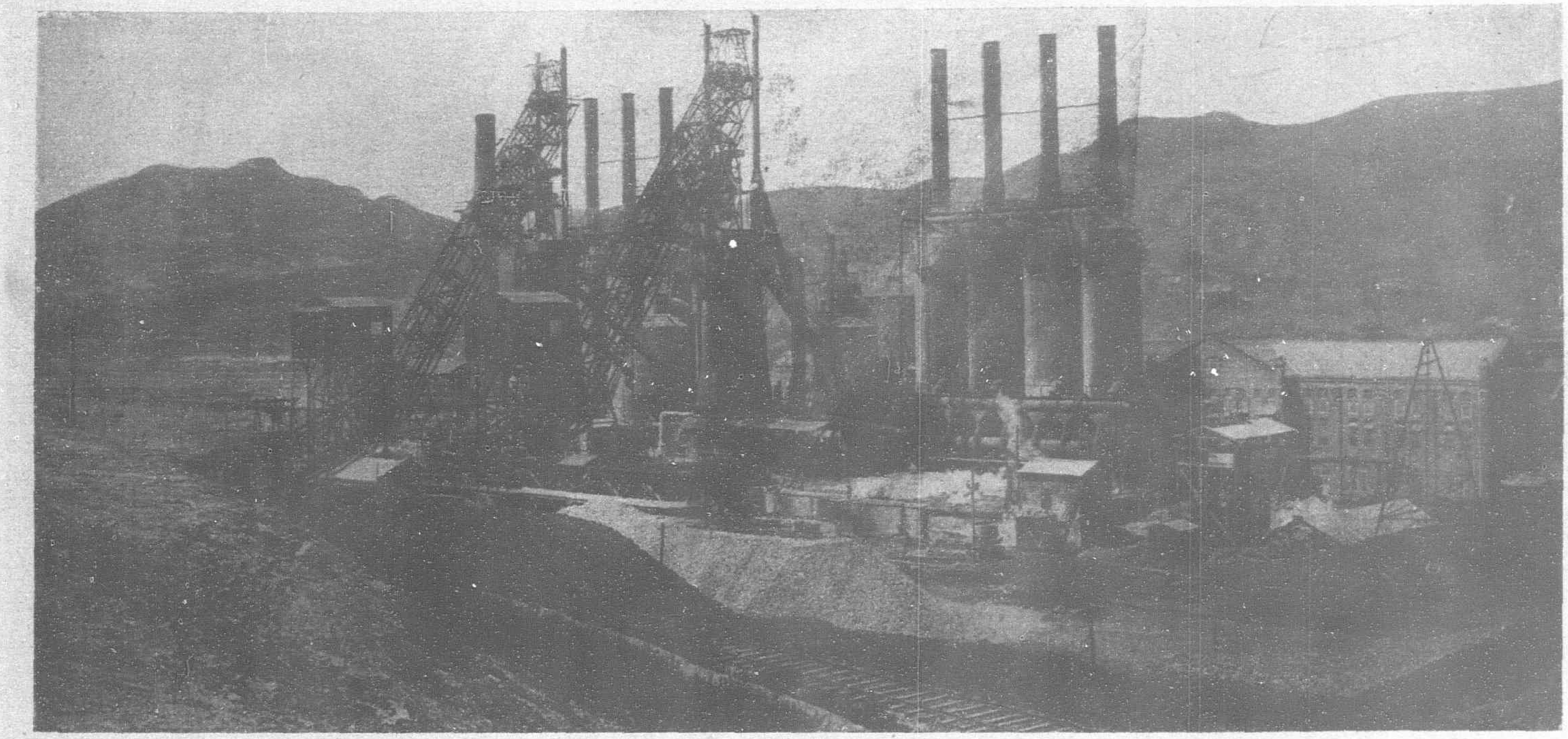
The coal mine and blast furnaces of the company are located in what is known as the Fen-chi district of Fengtien province, 47 miles east of Mukden on the Mukden-Antung division of the South Manchuria railway. Its commercial position is somewhat unfavorable, inasmuch as it is difficult for its product to compete with the superior advantages of location enjoyed by the Fushun mines of the South Manchuria railway. This was one of the compelling reasons which decided the Chinese government to give its consent to expand the original coal concession into an iron and steel enterprise. The mines being 283 miles from Dairen and 147 from Newchwang. its products are shipped to the latter port except when the Liao River is frozen over in winter and closed to navigation.

Penchihu Coal Field

The Penchihu coal field extending over an area of 9,444 acres, embraces 17 veins of varying thickness aggregating 550-ft., of which the following are being worked: the Paocha vein, 7-ft. thick, Hsiangtuan vein, 4½-ft., Choucha vein, 3½-ft., Ihsiching 5½-ft., Erhhsiching, 9-ft., Shanhiching, 3½-ft. and Wuhsiching, 4-ft., total thickness, 40-ft. The veins outcrop 900-ft. above the level of the Taitse River with a dip of about 15 degrees in the upper stratas and nearly 30 degrees in other places.

The first pit for mining the three upper veins, was sunk in April 1906, coal being struck at a depth of about 600-ft. Three inclined shafts were driven at the same time for haulage, drainage and ventilation. No. 2 pit, 12-ft. in diameter, was started in October, 1907 and sunk to a depth of 310-ft. This pit is lined with brick and serves for pumping and ventilating all the other pits and inclines. No. 3 pit was started in 1908. Originally, the Paocha and other veins were worked on the combined pillar and stall system but after various trials, sand-flushing was adopted for all the workings.

Hoisting and winding engines are used on the inclines for hauling out the coal cars and electric locos on the levels. Twenty-five pound rails are used on the inclines and twelve pound on the levels. For conveying the coal between the levels and the working places troughs made of steel plate are used in pit 1, which has a gradient of 30 degrees. In pits 2 and 3 where the gradient is only 18 degrees, baskets and sleds are used. Roller bearing steel coal

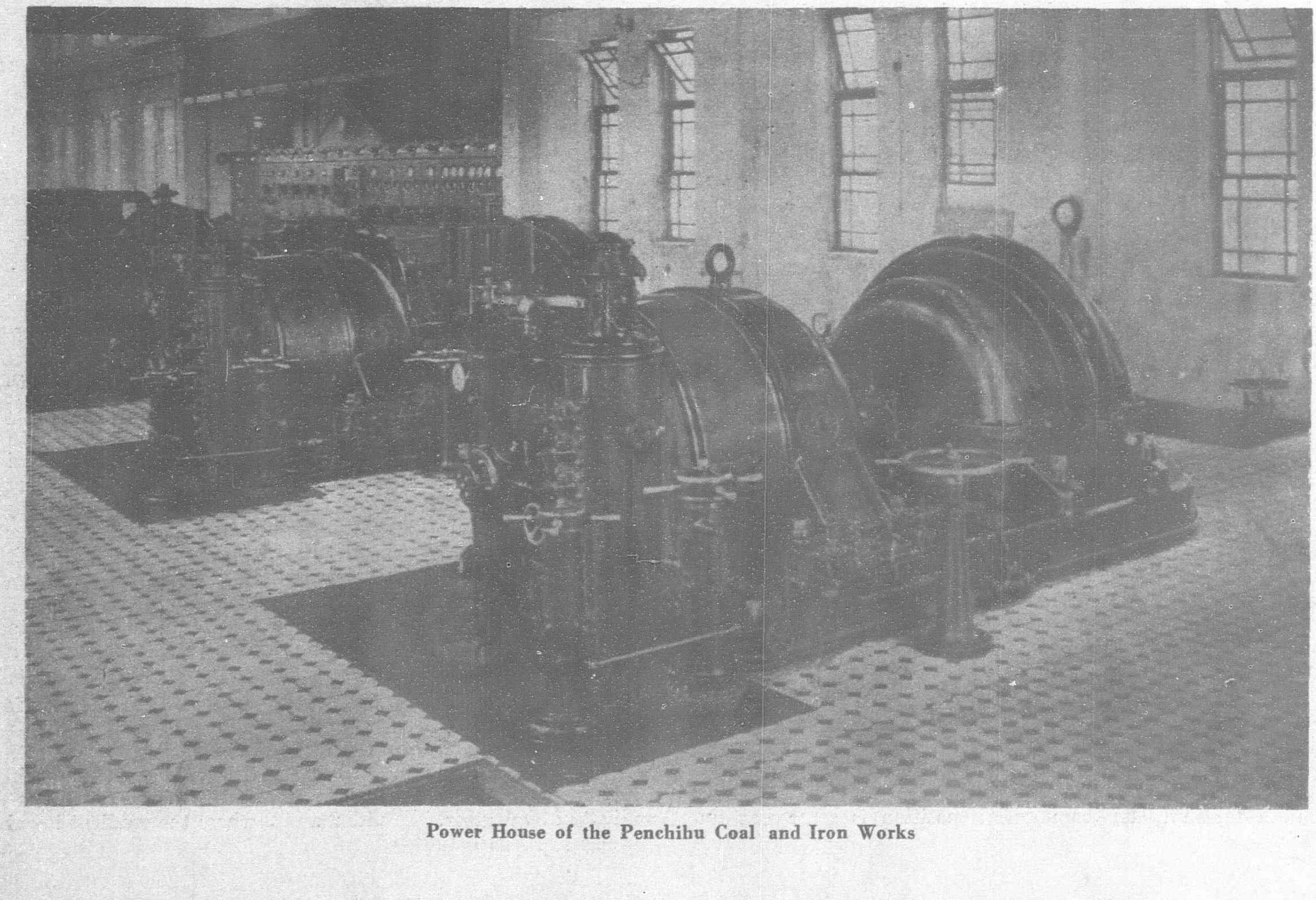


General View of the Penchihu Blast Furnaces

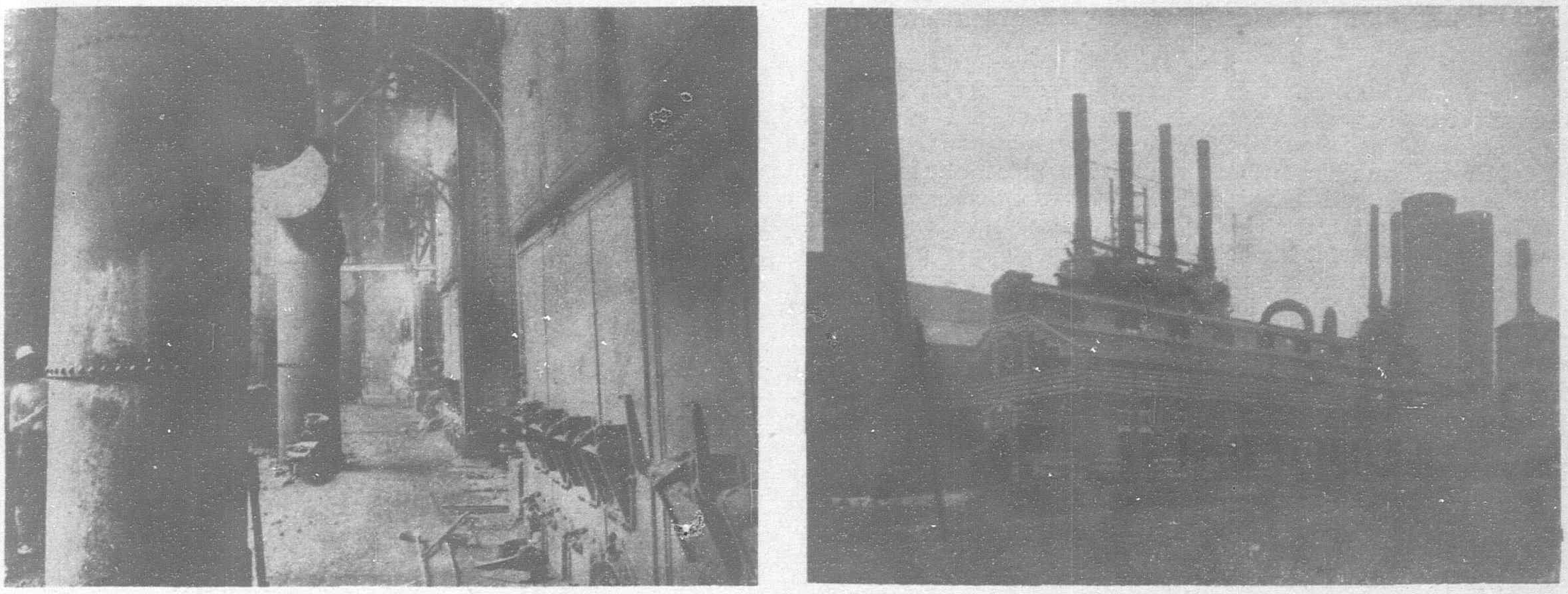
cars with a capacity of 25 cubic feet or 6 tons are used to bring out the coal.

Pit No. 1 was originally operated by a cross-compound winding engine, which was a converted to a motor driven type with a cable speed of 120-ft. per minute. In pits 2 and 3 a motor driven double drum winding machine with a speed of 150-ft. per minute is employed, the coal being carried to the screening plant by means of an endless cable. One motor-driven Capell fan of 140,000 cubic feet per minute installed at the mouth of pit 2 supplies ventilation to all the pits which are connected together in the lower levels. Interior ventilation is also produced by a number of fans of 1,000 cubic feet per minute installed at each pit. Motor-driven turbine pumps keep the workings dry. Clanny lamps are used by the miners and Davy lamps by the officials. Electric current is supplied to all the pits for power and lighting. The miners work in two shifts, one from 5 a.m. to 5 p.m. the other carrying on during the night.

The present output of the mines is from 2,800 to 3,000 tons of coal per day. No. 1 pit employing about 600 coolies is giving from 700 to 900 tons per day, No. 2 pit with the same number of workers from 600 to 700 tons and No. 3 pit from 400 to 500 tons per day. In pits 1 and 3, three veins are being worked and in pit 2 five veins; a total of eight veins having a total thickness of 40 to 45-ft.



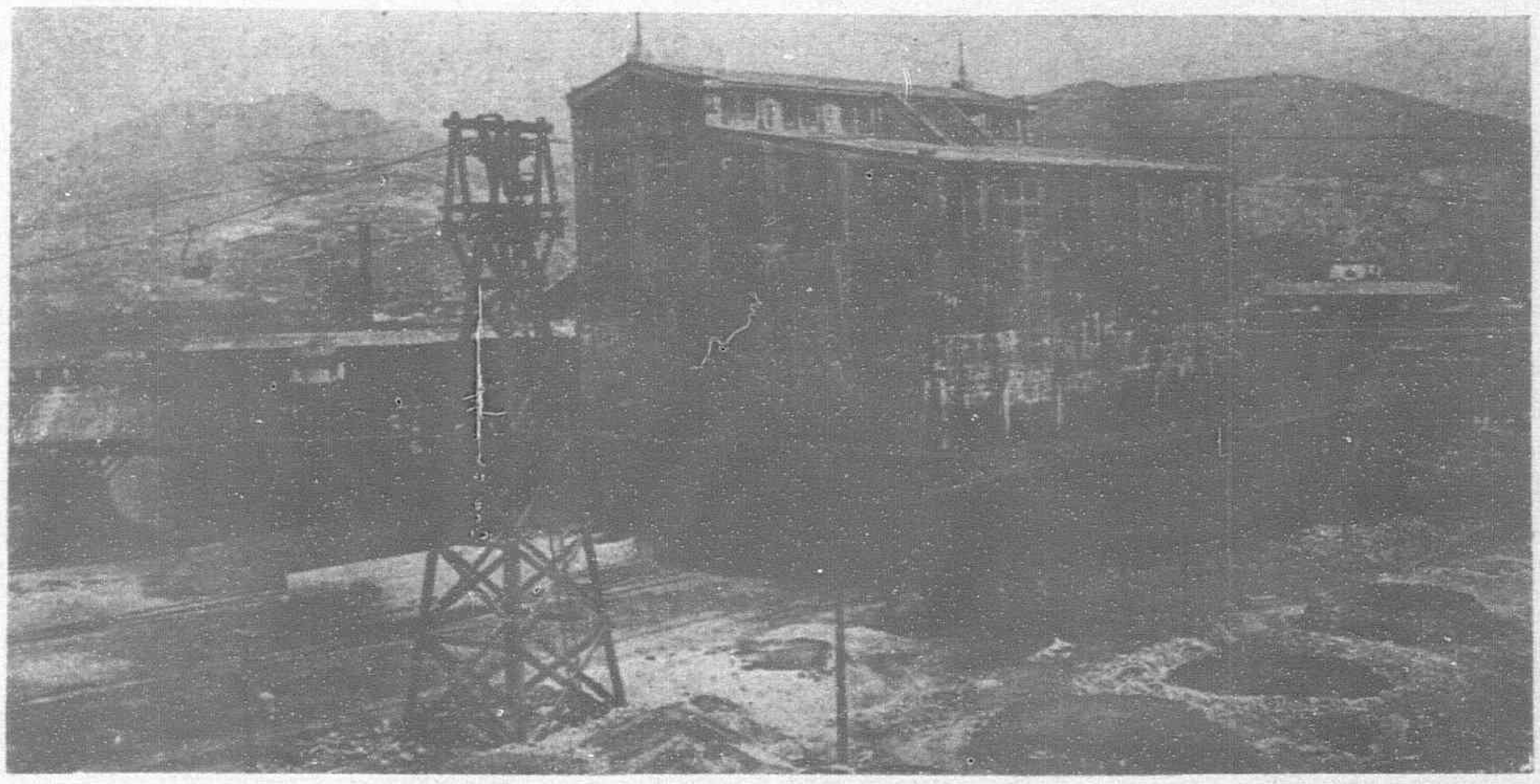
Power House of the Penchihu Coal and Iron Works



Exterior and Interior View of Boiler House at Penchihu

Electric Power Plant

Power for the various uses of the mine is generated at the company's plant attached to the works. It also supplies light for the towns of Penchihu, Kiaotao and Nanfen. The plant is equipped with one G.E., 2,500 k.w. and two A.E.G. 1,500 k.w. turbo-alternating sets. There are also two 840 h.p. A.E.G. and one 1,200 h.p. Escher-Wyss turbo-blower sets for the blast furnaces, three smaller direct current generators of Japanese make and two A.E.G. motors for driving the pit winding engines. The steam generating plant, using coal or blast furnace gas as required, has six Borsig boilers with a total of 4,300 square feet of heating surface and three B. & W. boilers with a total of 4,396 sq. feet of heating surface, working at 175 lbs, pressure superheated to 200 degrees.



Coal Washing and Screening Plant at Penchihu

Blast Furnaces

The two blast furnaces are of 130 tons capacity each. The first furnace, blown in on June 13, 1915, was purchased in England and Germany, while the second was made at the Shakako Works of the South Manchuria railway at Dairen. These furnaces are 88-ft. high, 11-ft. 1½-ins. in diamater at the furnace mouth and 9-ft. 10-ins. hearth diameter. The charging tower, worked on the Panlich system, is 164-ft. high.

The furnaces used to heat the blast are of triple McClure type each 20-ft. in diameter and 90-ft. high being surmounted by a 70-ft. stack. The intake for air is at the top and the waste heat of the blast furnace gases raises the air current to a high temperature before it is admitted to the tuyêres above the blast furnace hearth. The blowers operate at 2,500 revolutions a minute and furnish 720

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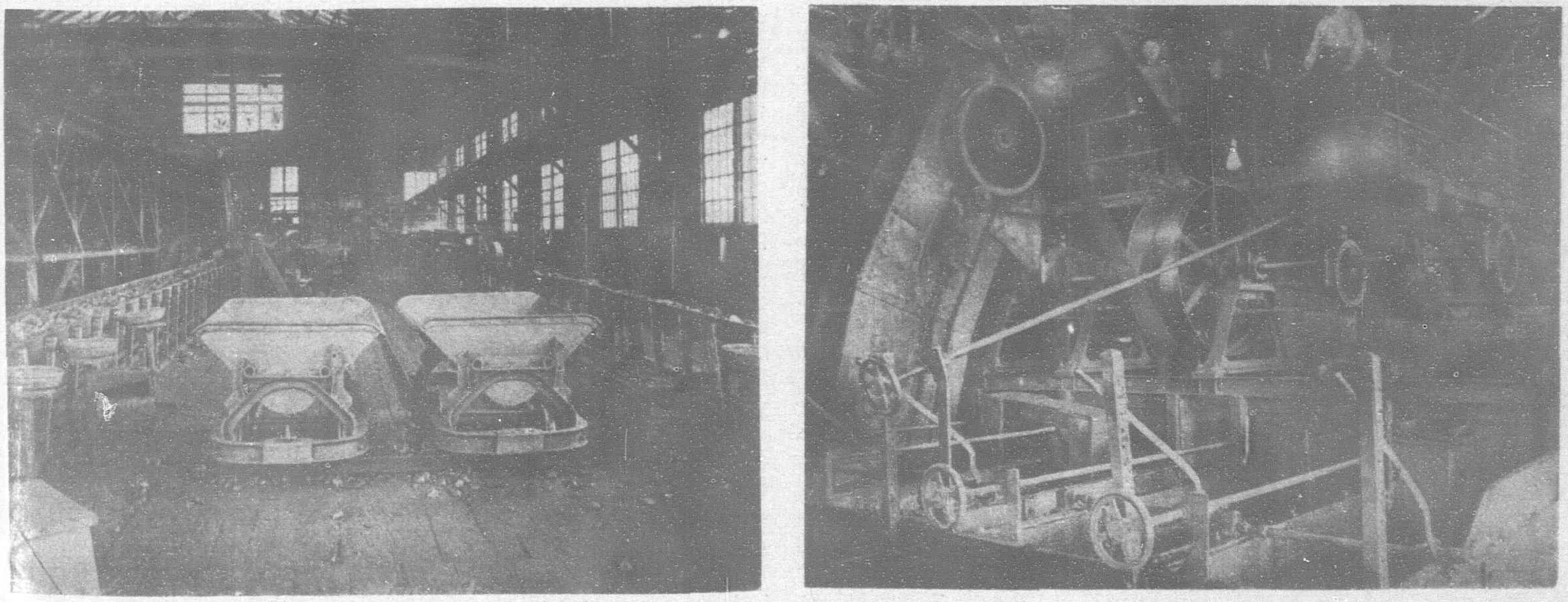


Interior of Coal Washing and Screening Plant

A Pioneer of Sino-Japanese Co-operation

(Continued from page 59).

modern Asiatic masters. The collection includes carvings, pictures and porcelains of marked antiquity, amongst which is a group of Buddhas considered as one of the national treasures of Japan. This is the famous Okura Fine Arts Museum, in the perfection of which its founder not only lavished his wealth but found that same relaxation from business cares and stimulant to his energies as did J. P. Morgan in his search for the beautiful in the art galleries of Europe.

In 1898, he established at a cost of a half million yen the Okura higher commercial school, in Tokyo, from which many students have graduated and made their mark in the business and industrial world of Japan. Another million was donated in 1907 to establish similar institutions in Osaka and in Seoul. He has contributed freely to succur the sufferers from flood and famine in Japan and China and last year donated a million yen to the emperor's relief fund for the earthquake victims.

The attitude of the house of Okura towards labor is best expressed by Mr. C Kadono, vice-president and active head of the Okura interests, in an interview recently published in *The Japan Advertiser*. At a time when it is generally admitted that Japanese laborers and skilled workmen are paid entirely out of proportion to their efficiency and earning power and a general tendency to economize by reducing wages is seen on all sides, the active head of the vast Okura interests takes the saner and broader stand that labor should be encouraged to greater efficiency and increased production by shorter hours and better wages.

The proper relation between capital and labor constitutes the most vital problem confronting the captains of industry in America and Europe and has been partially solved by increasing the efficiency of labor through a betterment of its economic and social status. The same problems will have to be faced as Japan becomes more highly industrialized, and their solution will also depend largely upon the measures taken by capitalists to better the general condition of her working classes Mr. Kadono sounds the right note. The road to real prosperity and world recognition of Japan's right to equality lies in this direction.

The life of Kihachiro Okura is a romance of money-making as interesting and as worthy of high commendation as those of many better known American and European millionaires. Born in 1836 in Echigo, he came to Tokyo at the age of eighteen to seek his fortune, starting at the bottom of the ladder as an employee in a drug store. Five years later, he opened business on his own account. The wars of the restoration gave to Baron Okura his real start on the road to fortune through the importation and sale of arms to the clansmen, his business bringing him into intimate relations with the statesmen of the early Meiji period and earning for him a commanding position in the commercial world. In 1872, when Prince Ito made the first tour of foreign countries in order to investigate foreign methods and apply them to Japan, Kihachiro Okura, formed part of his large suite, the first Japanese business-man to make the tour of the world. On his return in 1874 he organized the Okura-gumi, the pioneer foreign trading company in Japan, its branch office opened in London during the same year being the first branch of a Japanese concern in a foreign country. From this beginning the activities of the Okura-gumi have expanded until now they cover nearly every line of commerce and industry with offices in all the principal cities of Japan and branches throughout China as well as in Vladivostok, Sydney, San Francisco and New York.

The civil war of 1894, the Sino-Japanese and the greater Russo-Japanese conflict found the Okura-gumi fully equipped and organized to act as the leading government contractors for the supply of arms, munitions and supplies to the military forces. The provisioning of Japan's army and navy had since constituted one of the most interesting branches of the wide-spread Okura activities, leading the firm to engage heavily in the China and Mongolia cattle trade and to acquire cold storage plants in Tsingtao, Tientsin and Manchuria. In the struggle for existence which confronts Japan, the need for beef, mutton and other meat foods is increasing rapidly from year to year and the one dependable source of near-by supply lies in Chinese territory, in the province of Shantung and the plains of Mongolia. The foundation laid by the Okura-gumi as army contractors has given the firm an exceptional advantage to utilize its organization for this purpose.

Outside of the companiee which bear his name, the Okura holdings are so wide and varied that it would be difficult to enumerate them all. Sufficient to say that Baron Okura is deeply interested in the Bank of Taiwan, the Hokkaido Colonial Bank, the South Manchuria Railway, the Tokai Paper Mill, Otaru Timber Co., Japan Leather Company, Japan Chemical Industrial Co., Imperial Hotel, Imperial Theatre, Imperial Flax Co., Tokyo Rope Mfg. Co., Japan Shoe Mfg. Co., Japan Beer Brewery Co., Japan Sugar Co., Tokyo Electric Light Co., Industrial Bank of Japan, Ujigawa Hydro-Electric Co., Nlitaka Sugar Refining Co., Railway Car Mfg. Co., Tokaichi Development Co., Imperial Refrigerator Co., Tokyo Wool Factory, Akita Timber Co. and many others.

In China, he has built up the Penchihu Coal & Iron Mining Co., and is one of the largest shareholders in the Han Yeh Ping Iron and Steel Corporation. The engineering world, however, will always associate the name of Okura with the introduction of modern machinery and industrial methods into Japan. This branch of the Okura business was established in 1891 and in addition to acting as the agents and representatives of many of the best foreign manufacturers of machinery, the engineering department entered into the general contracting field undertaking all branches of public works, buildings, bridges, railway and harbor construction and reclamation work.

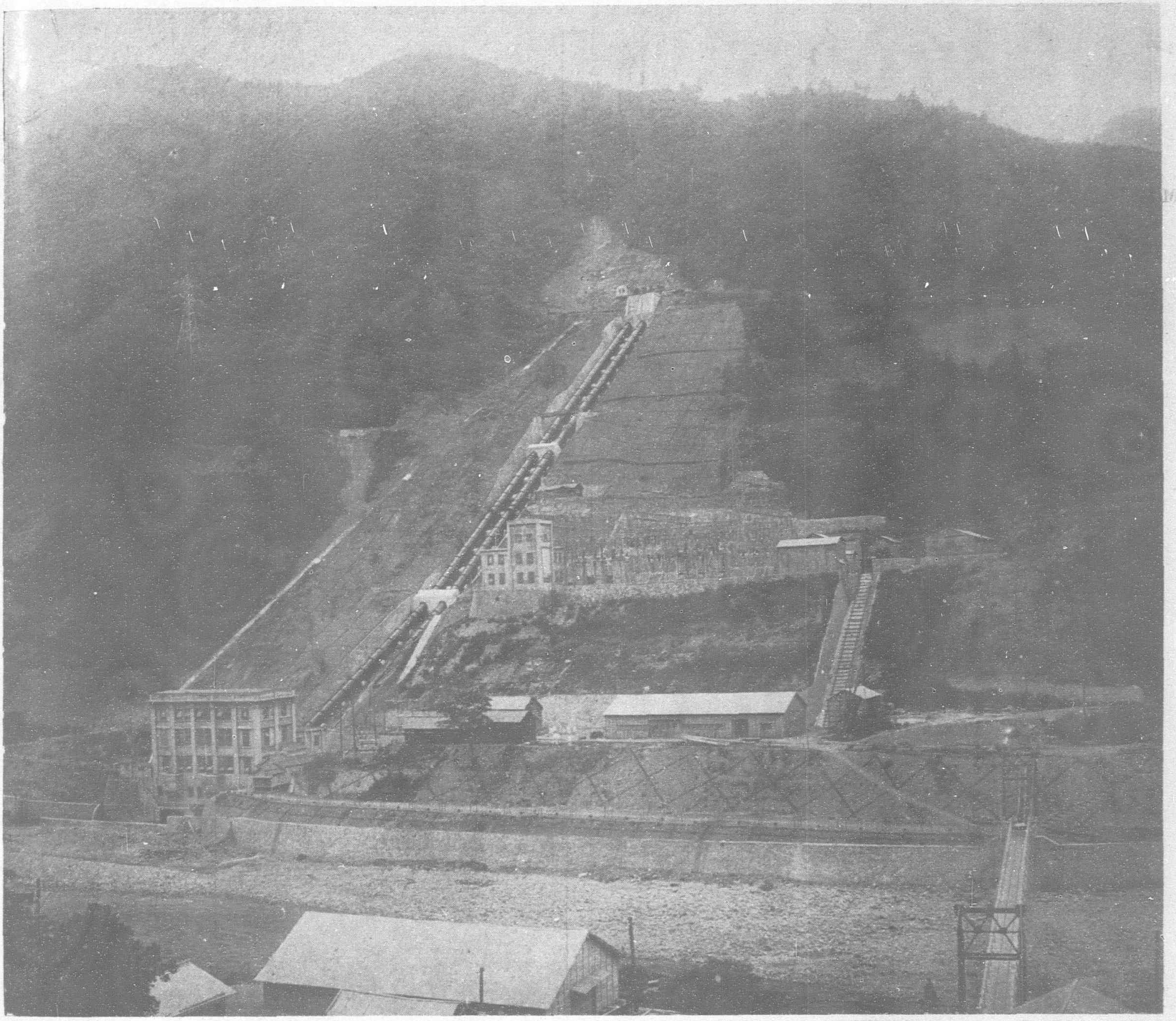
Early in life Baron Okura recognized the vital importance to Japan of the closest political and commercial relations with China and many of his years and a great part of his fortune has been spent in developing this intimate contact through the investment of Japanese money in Chinese concessions and in the establishment of joint industrial undertakings. He has always played fair with his Chinese associates and as a consequence enjoys their respect and confidence to a degree greater perhaps than any Occidental or other Japanese. A large part of his energy has been expended in developing the various resources of Manchuria and Mongolia.

Although these investments have not always proved profitable and the successful operation of various enterprises has been hampered by Chinese ignorance, hostility and official interference, Baron Okura remains firm in his belief that it is in this region that Sino-Japanese business co-operation will bring the greatest and most lasting benefits to both countries. The prosperity that has come to Manchuria, filling the pockets and swelling the bank accounts of Chinese of all classes, is due primarily to the operation of the South Manchuria Railway but the many independent Japanese enterprises in that region have also played a large part in creating these riches. Foremost amongst the latter has been the firm directed by the optimistic Baron whose faith in the country has brought many millions into it on which the Chinese alone have so far drawn down dividends.

His Chinese friends with their profound veneration for age and characteristic lavishness in making presents to those they respect, deluged the Baron with such costly gifts on the occasion of his recent birthday that many had to be returned to their senders because of the prohibitive luxury tax now in force in Japan. It was largely to reciprocate this expression of good-fellowship and entertain his Chinese friends in a proper manner that he planned the gala fêtes that met with such opposition from the Radicals of his own country.

The incident, however, closed happily with a series of receptions held at the Imperial Threatre in Tokyo (in which Baron Okura is the chief shareholder) in honor of the occasion. Thousands gathered to pay their respects to this last of those leaders of Old Japan who had the foresight and courage to pry their country out of the rut of ages and elevate her through industry and commerce to her present proud position amongst the nations. The premier and members of his cabinet, officials of all grades and ranks in the service of the Mikado, bankers, manufacturers and merchants, whose names are famous in international trade and finance, members of the diplomatic corps, foreign and Chinese business men, noted educationalists, men of science and letters, and friends in many other walks of life gathered to honor him. The most nted actors of the Japanese stage and the famous Mei Lang-fang entertained them. It took five days to hold the receptions, a remarkable tribute to the esteem in which he is held not only in Japan but in other countries.

His business career ended, he now bravely announces his determination to pass the remaining years of his life in promoting friendship and closer relations between Japan and China. He very wisely declares that if permanent friendship is to exist between the two countries it must be based on economic co-operation and to place these ideas into practice he says that notwithstanding his advanced age he will make a visit to Mongolia this spring to arrange the details of a new undertaking.



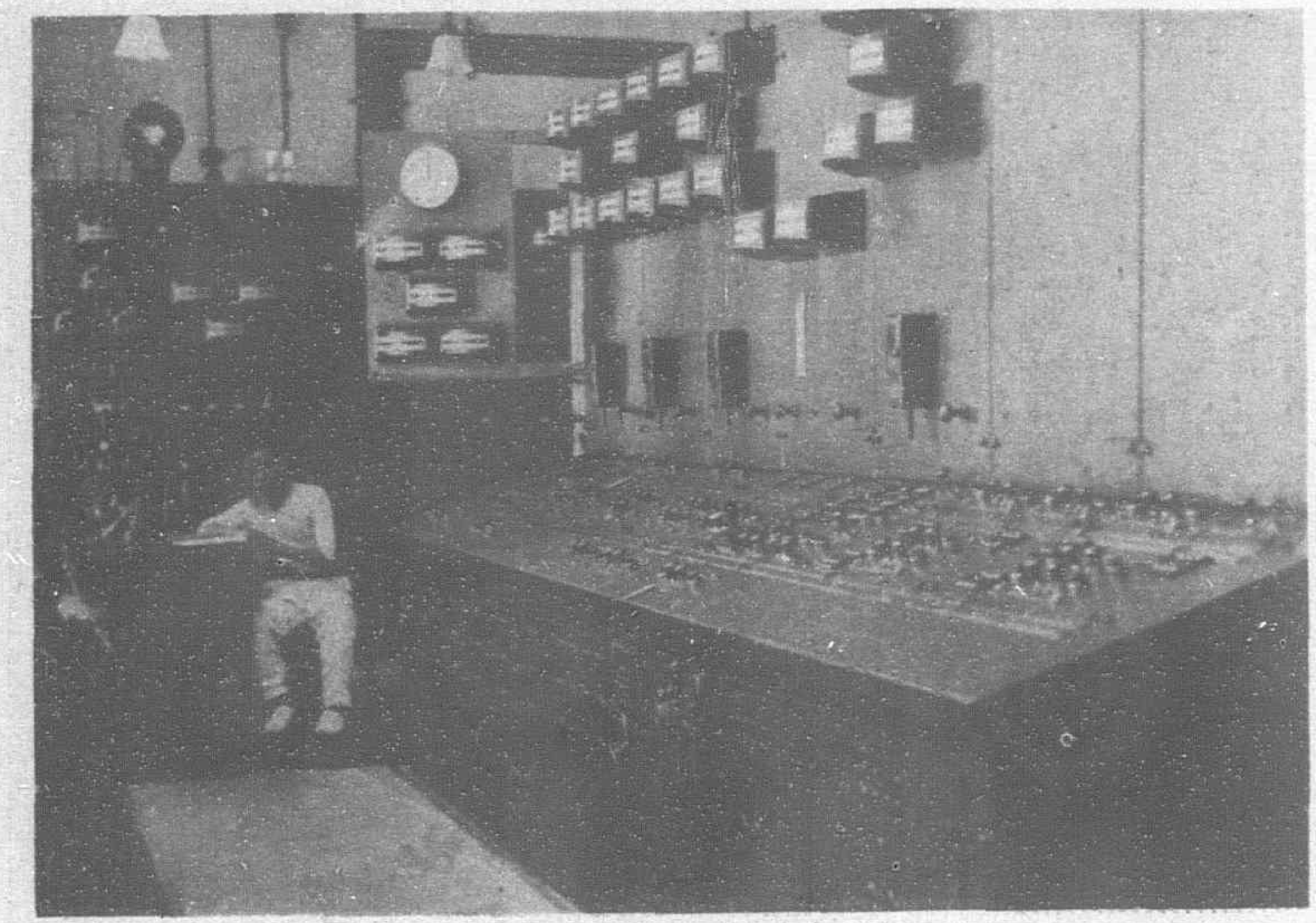
View of the Ryushima Generating Station of the Keihin Electric Power Co. Capacity 26,000 KVA.

Power Development of the Keihin Electric Power Company

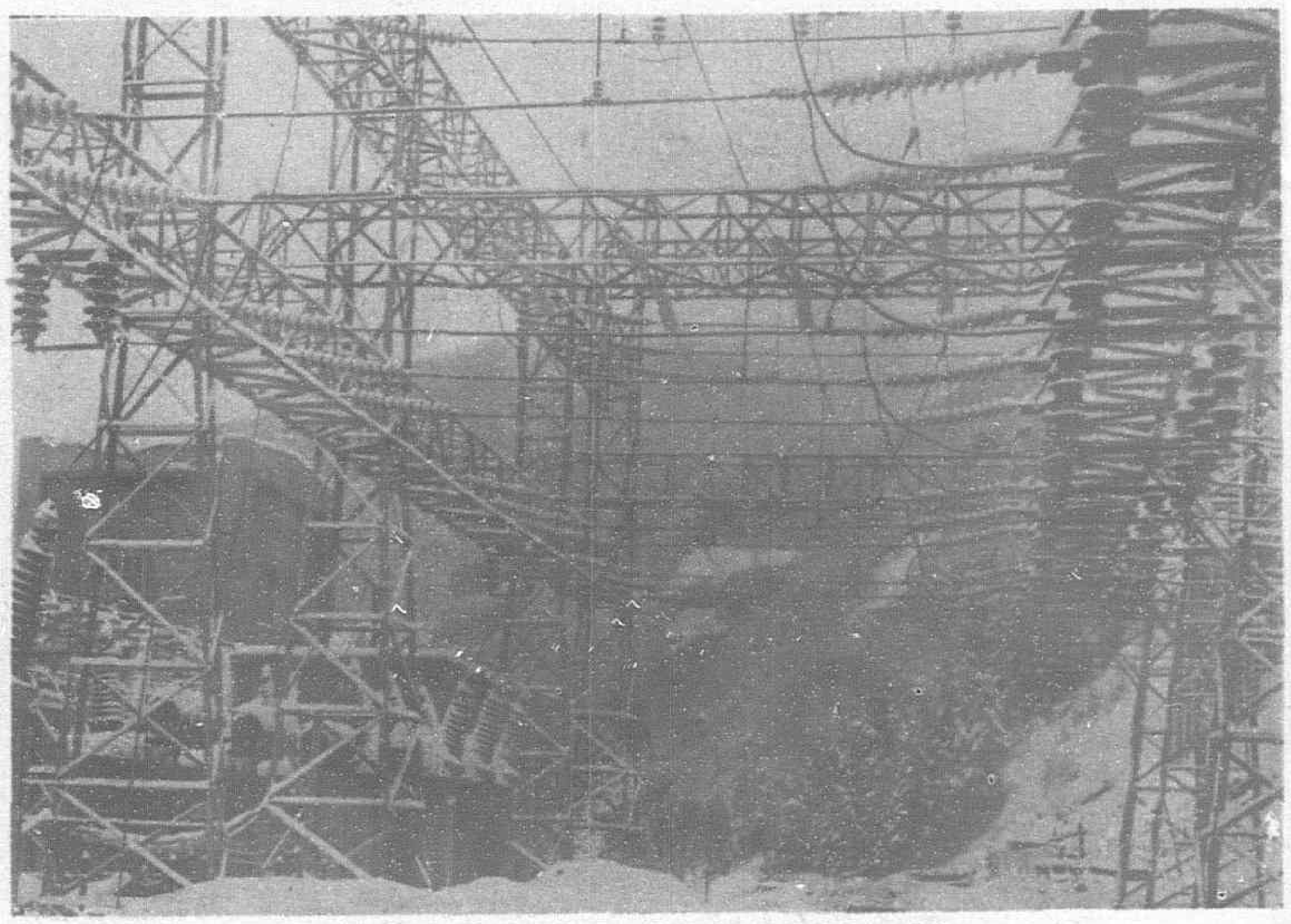
From Notes Supplied by Y. Yamada, Chief Engineer of the Keihin Denryoku K. K.

IN the development of high voltage transmission for tying together the scattered plants of large super-power systems in Japan, 154,000 volts has been determined as the standard voltage for the step-up transformers at the generating stations, with a secondary distribution at the receiving stations in the Tokyo district of 66,000 volts. One of the pioneer companies to adopt the new standard was the Keihin Denryoku Kabushiki Kaisha, whose power stations in Nagano prefecture have been transmitting current at this pressure to Yokohama and Yokasuka since 1923. The first unit of the system, known as the Ryushima generating station located on the Saikawa River has a capacity of 20,050 k.v.a. The receiving station at Yokohama is equipped for 66,000 k.v.a. and the two are connected by 125 miles of double circuit transmission line.

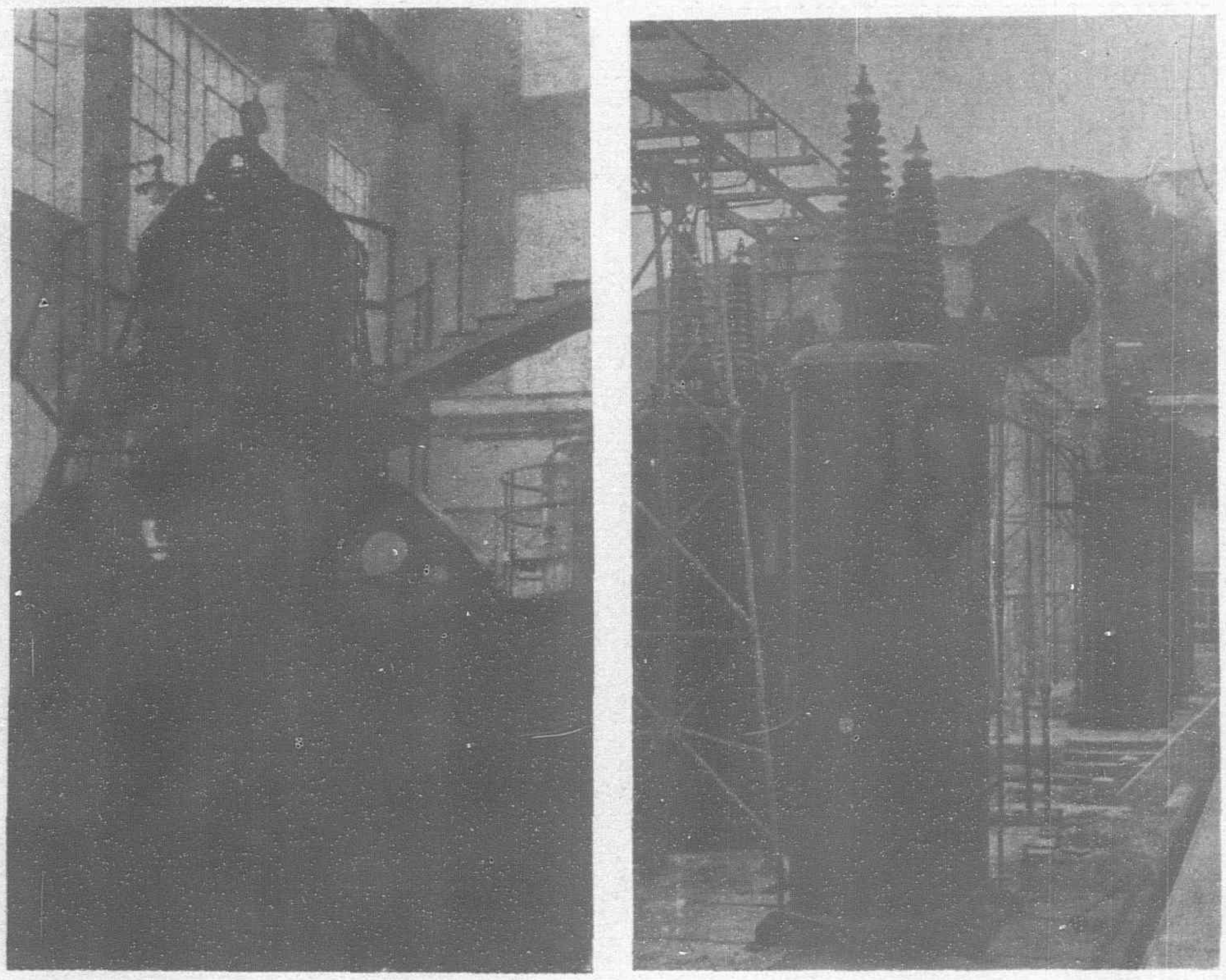
The power for this station is obtained from the Saikawa River which has its source on the Japanese alps. The normal flow is 720 cubic feet per second and 400 cubic feet minimum with an effective head of 430-ft. The water, led through a canal 5.78 miles long (97 per cent. tunnels) takes in the Oshirokawa and Kurokawa rivers on its way to the head tank at Ryushima. Two lines of riveted steel pipe, 810-ft. long, 7-ft. 6-in. and 7-ft. in diameter. $\frac{5}{16}$-in. and $\frac{15}{16}$-in. minimum and maximum thickness, convey the water from the head tank to the station. There are also two regulating ponds with storage capacities of 1,920,000 and 2,260,000 cubic feet for assuring the peak load during the winter months.



Control Switchboard at Ryushima



Outdoor Switching Station at Ryushima



RYUSHIMA POWER STATION

One of the 13,000 KVA, G.E. Waterwheel Driven Alternators

6,000 KVA Transformers, 6,600-154,000 Volts.

Power House

As will be seen from the illustration, the power station consists of an indoor and outdoor installation, the latter being located half way up the hill. The power house of reinforced concrete construction is equipped with two Allis-Chalmers vertical shaft, Francis type turbines, developing a maximum of 18,000 horse-power at 375 r.p.m. These turbines are provided with water cooled lignum-vitæ bearings and telescopic draft tubes for easy handling and inspection of the runners. The governors, installed on the switchboard floor for convenience of attendance, are fitted with shaft flyballs. Pressure regulators of 60 per cent. discharge capacity are also provided for safety.

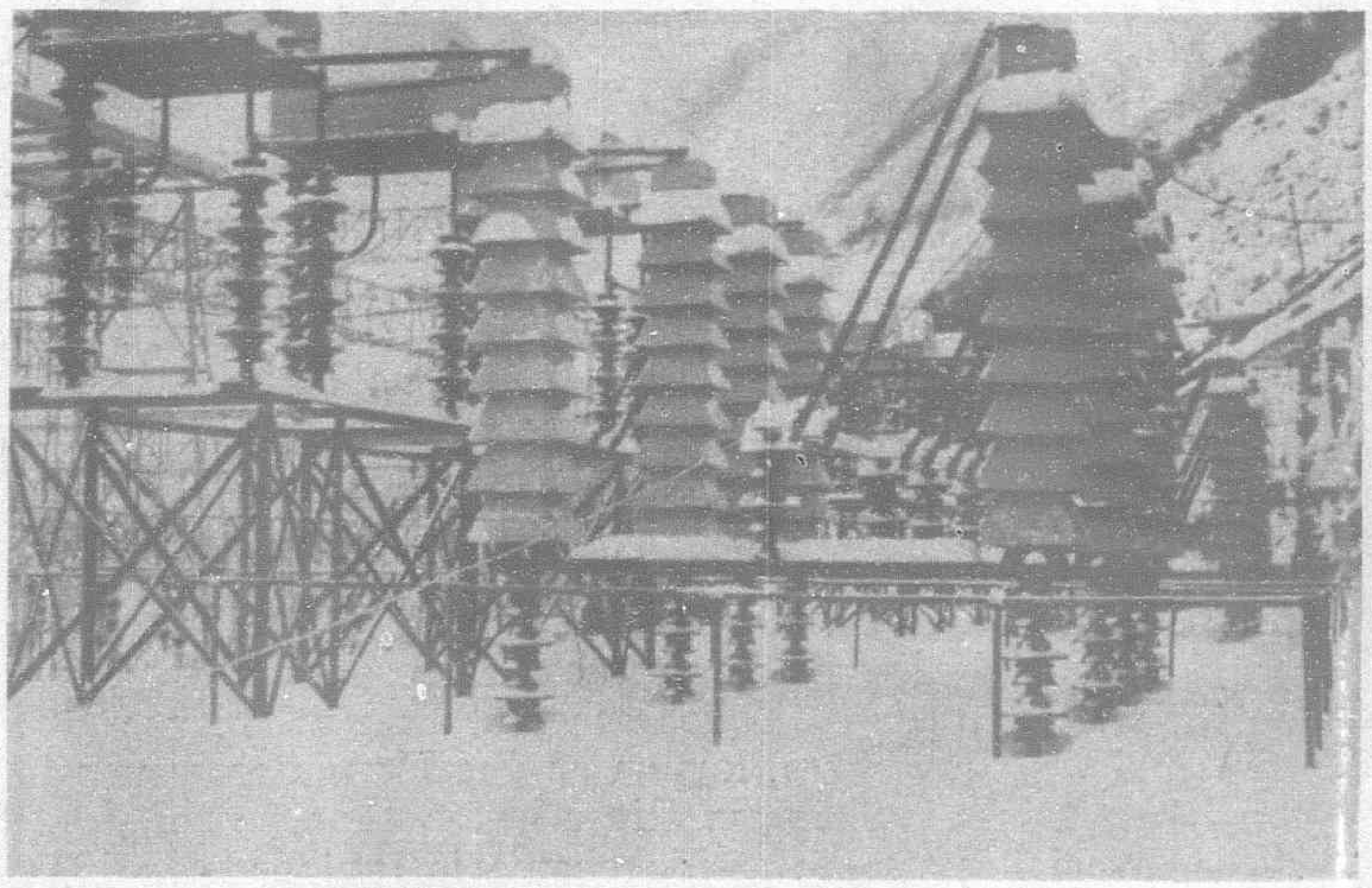
The turbines are coupled direct to General Electric generators, each 13,000 k.v.a. 6,600 volts, 50 cycles with flywheel effect of 1,100,000-ft.-lbs. These generators are fitted with spring thrust bearings. The direct coupled exciters are of 180 k.w. 250 volts, direct current, shunt type with commutating poles, each capable of exciting two generators.

The main control board is of the G. E. bench type, double bus system arranged on bus bar compartments. The 6,600 volt circuit breaker is of the H. 6 oil type made by the General Electric Company, their interrupting capacities being guaranteed to 20,000 amperes at 15,000 volts normal frequency.

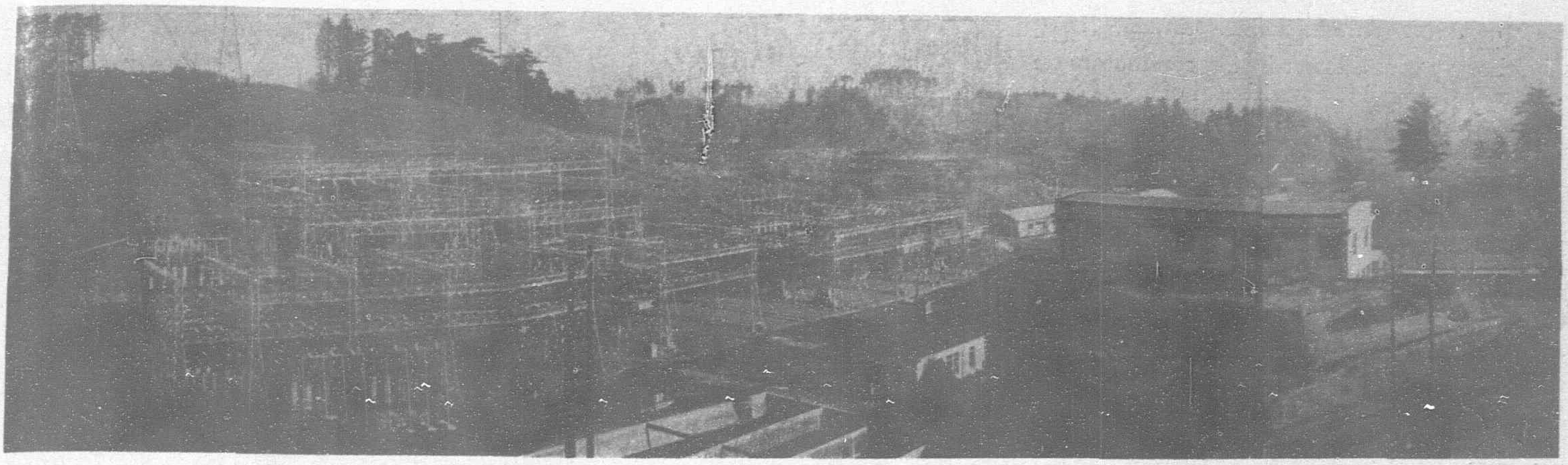
Outdoor Installation

This consists of two G. E. step-up transformers, each single phase, water-cooled, 6,000 k.v.a. 6,600-89,000 volts, 50 cycle, connected up delta-star, the neutral point being grounded through 900 ohms

154,000 Volt Oil Circuit Breakers on the Yokohama Line

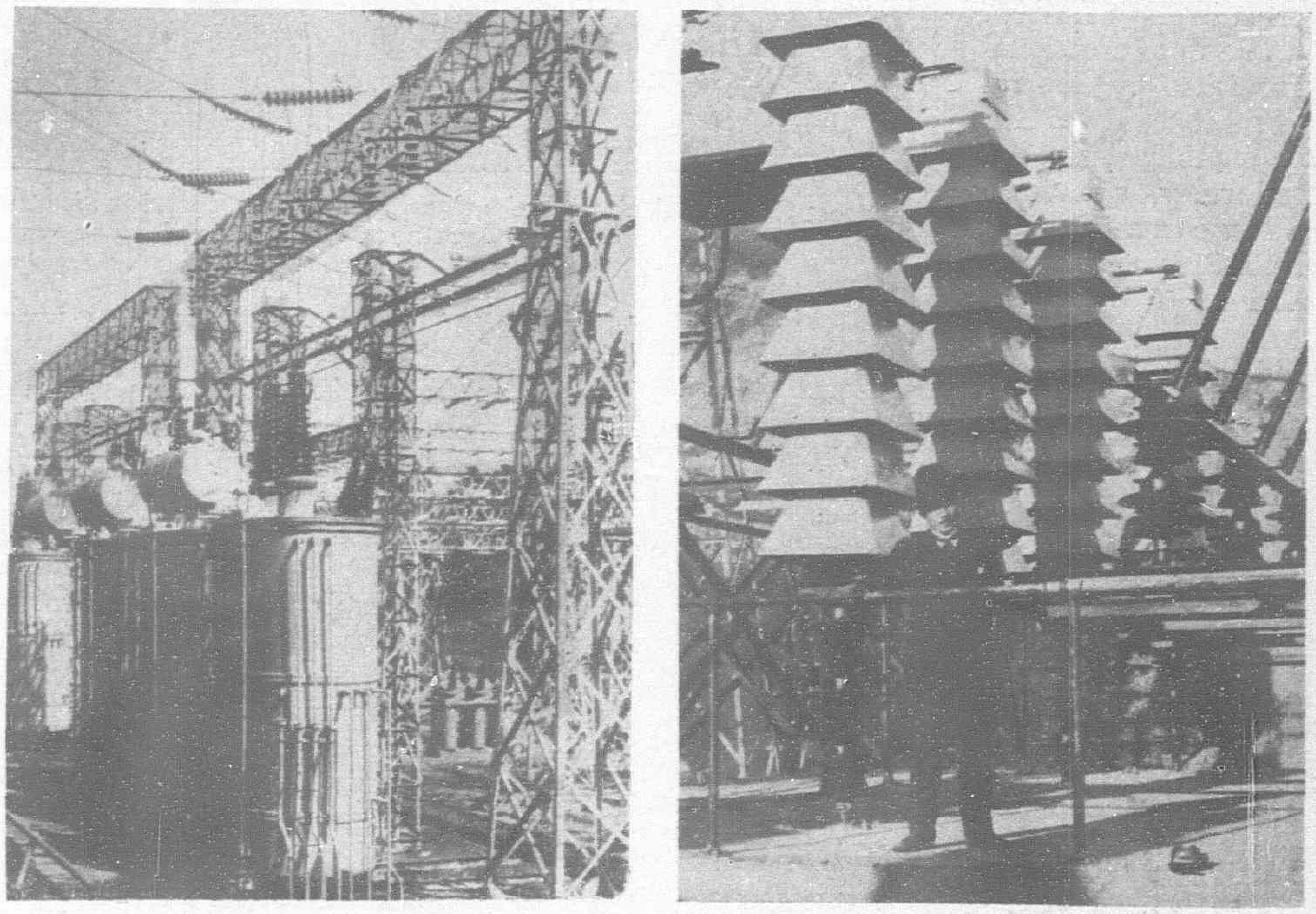


Oxide Film Arresters on the Yokohama Line



The Yokohama Receiving Station of the Keihin Electric Power Company at Totsuka

resistance. The double bus arrangement is on a steel frame structure. The oil circuit breakers for 154 k.v. are of the FHKO-36-42 B type made by the G. E. Company, the interrupting capacities being guaranteed at 2,300 amperes at rated voltage and frequency. The first oxide film lightning arresters for such high voltages to be used in Japan have also been installed.



YOKOHAMA RECEIVING STATION

6,000 k.v.a. Step-Down Transformers, 140-000—66,000 volts, with Tertiary Windings for Syn-Chronous Condensers

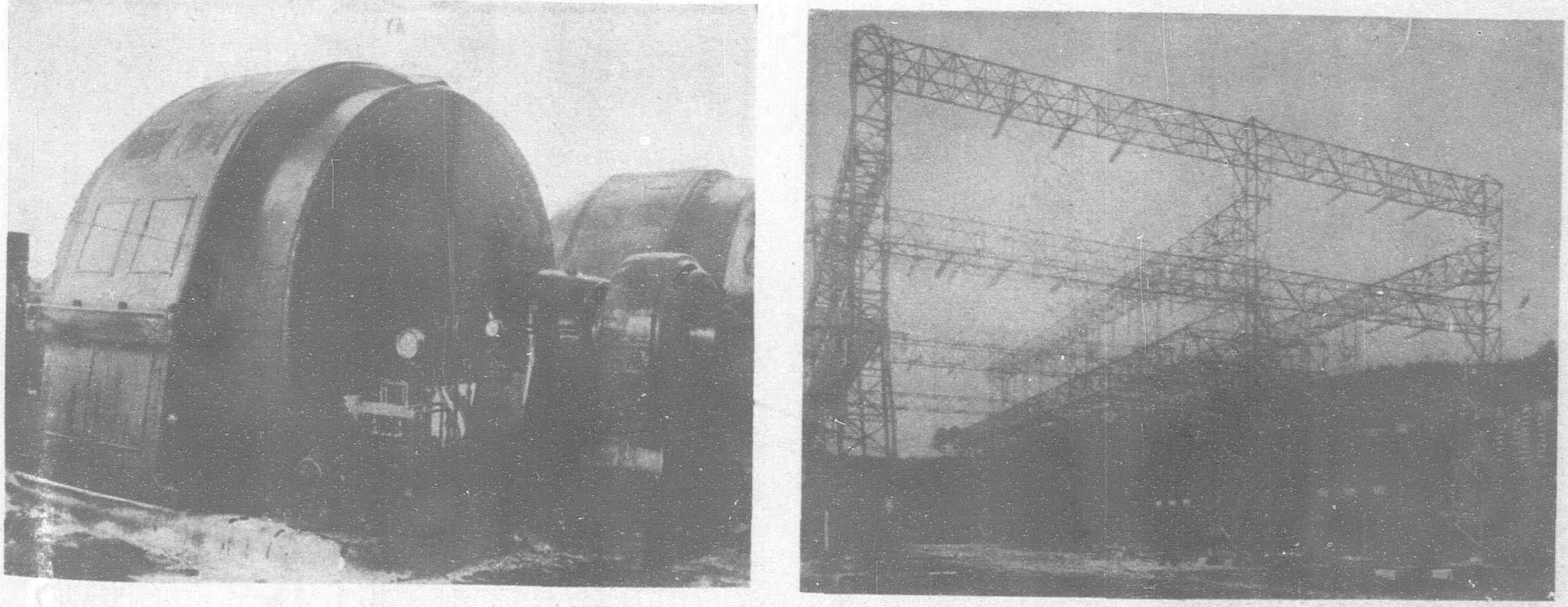
154,000 volt Arrester Stacks

Transmission Line

The transmission line extending from Ryushima to Totsuka near Yokohama, 125 miles in length, cost Y.10,000,000 or about fifty per cent. of the total installation cost. The line not only transmits power from the Ryushima station but takes 17,000 k.w. from the Momayama generating station of the Daido Electric Power Company, and 34,000 k.w. from the Takasegawa station of the Toshin Electric Company at the Shioziri switching station, distributing 25,000 k.w. of this power to Tokyo at the Hashimoto switching station.

The conductors used are steel reinforced aluminum cables 409,000 c.m. from the American Aluminum Company and 400,192 c.m. copper cables of Japanese manufacture. The aluminum cables are used on the first ten mile section where transmitted power is assumed to be less than in the further sections.

There are 942 galvanized steel towers set on concrete foundation, including 689 standard towers, 168 angle towers, 68 strain towers, 8 transposition towers and 9 special towers carrying three phase single circuit on each side and a ground cable on their



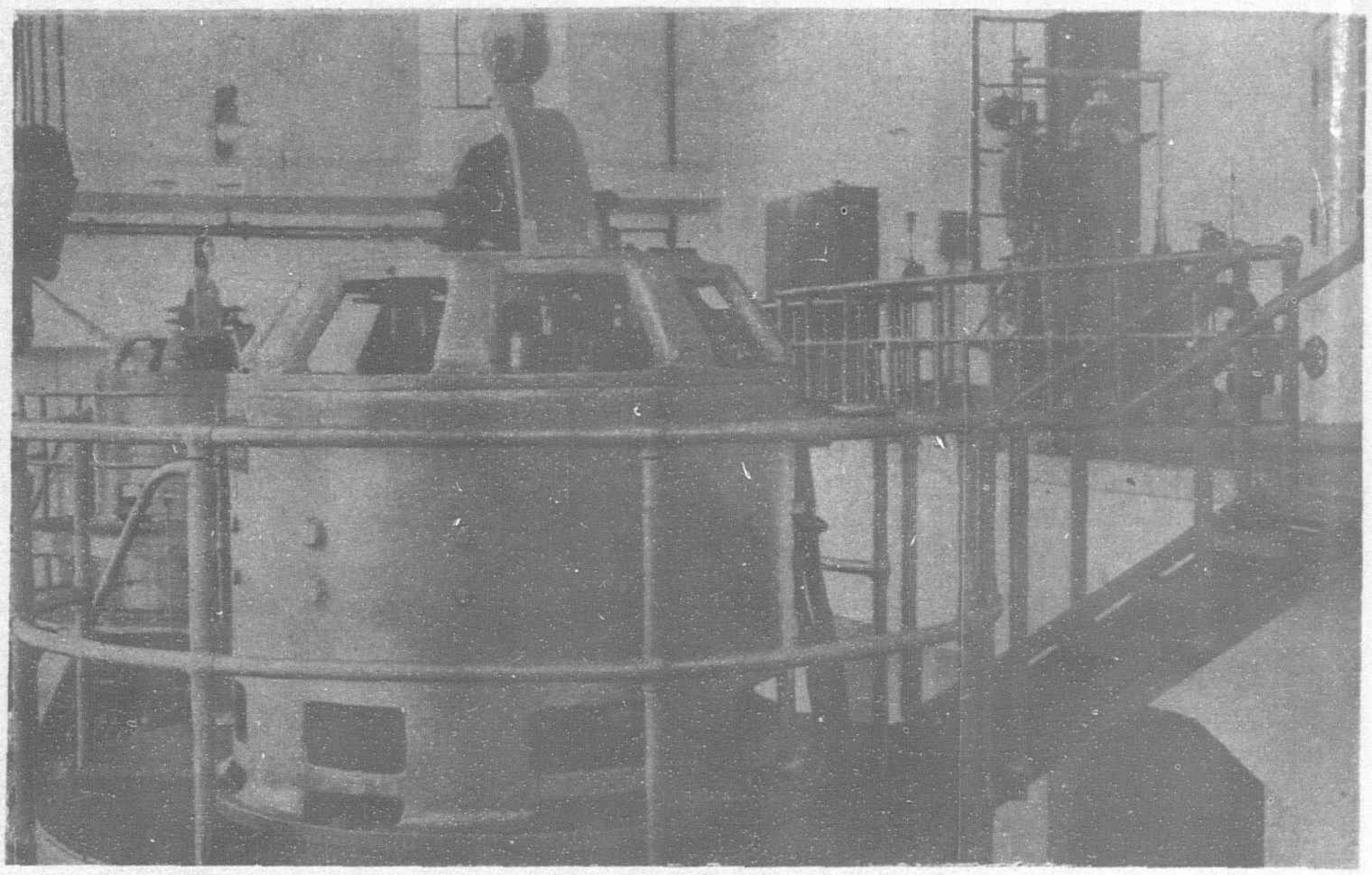
YOKOHAMA RECEIVING STATION

15,000 k.v.a. Synchronous Condensers

Outdoor Sub-Station, 154,000 volt side

tops. The line conductors are arranged vertically, the upper and lower laying conductors on a vertical plane with a horizontal offset of 2-ft. 5-in. for the middle conductor and vertical spacing of 13.5 feet. The line, transposed four complete turns in the total length, is subdivided in five sections by switching stations where future incoming and outgoing lines will be connected.

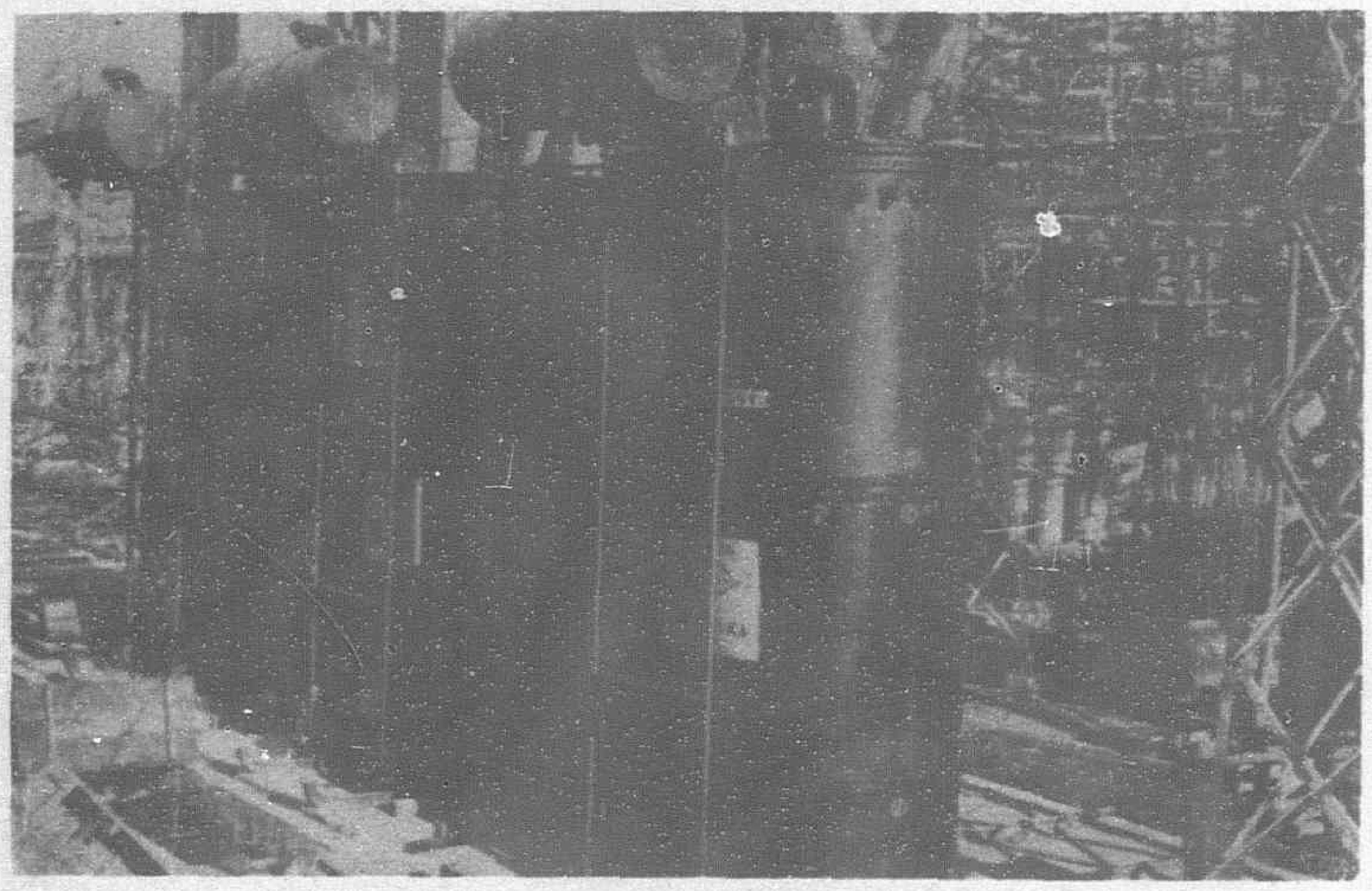
Insulators are of the suspension type, ten inches in diameter, part manufactured by the Ohio Brass Co. and part in Japan. There are ten units for standard towers and eleven units for angle and strain towers, etc. Care has been taken that eleven unit stringing is used for high altitudes (4,000-ft. above sea level) along the line. Four circuits of telephone lines are on separate wooden poles and satisfactory communication is obtained. A relay combination of 6 inverse time limit overload relays IA-101, an auxiliary relay PQ-3, and a duo directional over current relay IB-Y2 furnished by General Electric Co. is used at the sending end for line protection. Another relay combination of 3 inverse time limit overload relay, a reverse power relay IK-105, and a low current inverse time limit overload relay IA-103, is used at the receiving end for line protection.



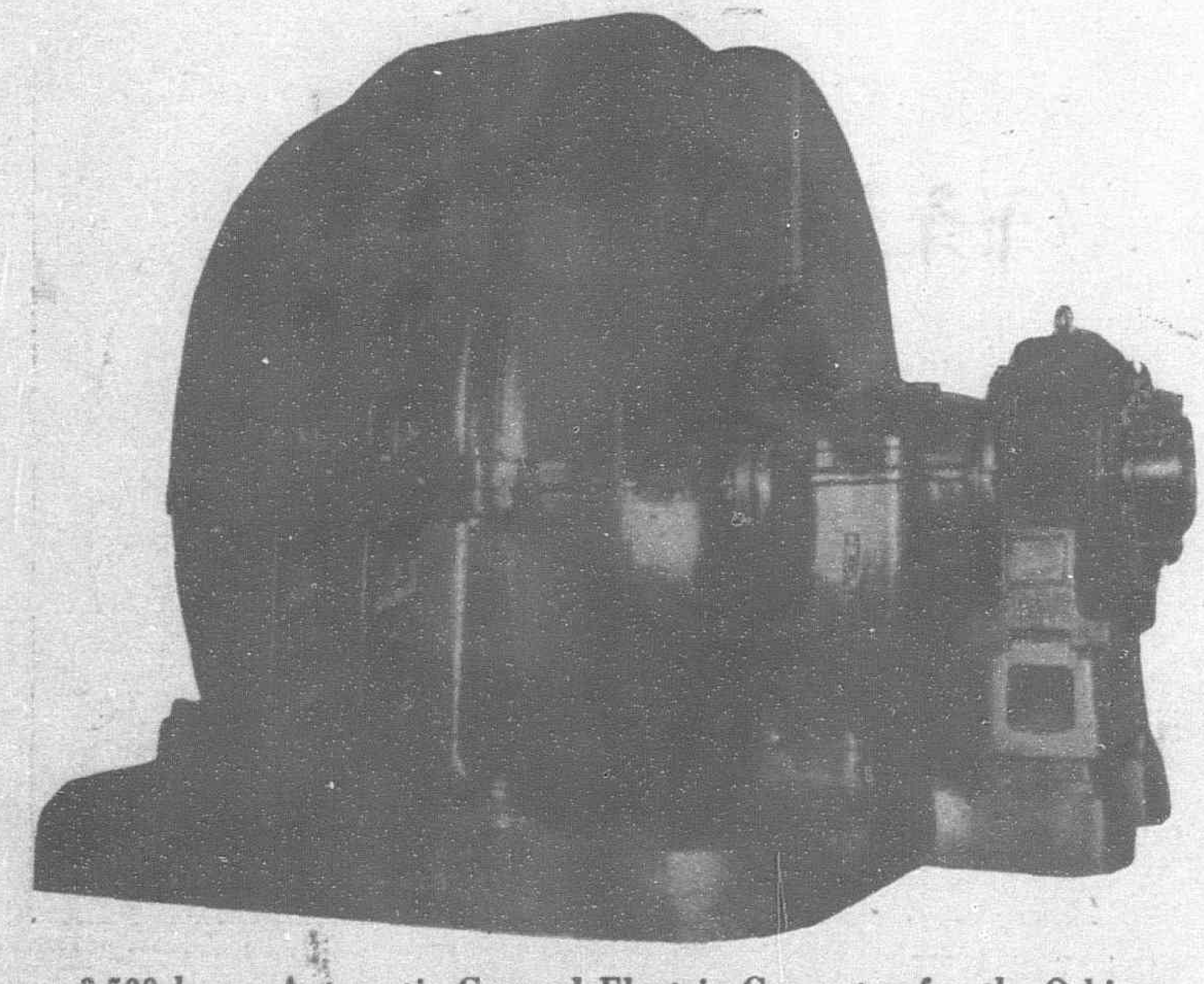
Direct Coupled Exciters at the Ryushima Station, showing also the Allis-Chalmers Turbine Governor in Switchboard Floor

Receiving Station

At the receiving station, the transmited power is stepped down from the transmission voltage of 140,000 volts to the feeder voltage of 66,000 volts and combining the power from the Hakone power stations of Tokyo Dento Kabushiki Kaisha, is distributed to Tokyo, Yokohama and Yokosuka. Two banks of G. E. step-down transformers, each single phase, water-cooled, 10,000 k.v.a., 11,000 k.v.a., 5,000 k.v.a., 80,900-38,1,000-11,000 volt, 50 cycle are connected up star-star-delta, the tertiary windings of 11,000 volt being provided for synchronous condensers.



Additional 11,000 k.v.a. Transformers at Tutsuka



3,500 k.v.a. Automatic General Electric Generator for the Oshiro Power Station of the Keihin Electric Power Co.

Two G. E. Synchronous condensers, each 15,000 k.v.a., 11,000 v., 3 phase 50 cycle, 600 r.p.m., are installed. Condensers are started by starting compensators. Buses for 140 k.v. and 66 k.v. are arranged on outdoor steel structures. Bus for 11 k.v. is arranged in bus bar compartment.

All switching equipments are manufactured by the General Electric Co. The station will supply power to a substation of imperial government railway near future and play an important role in the railway electrification.

The Keihin Denryoku has also ordered from the General Electric Company the electrical equipment for what will be the largest automatic hydro-electric power generating station in Japan. The station, to be constructed on the Oshiro River, will consist of a 3,500 k.v.a. generator driven by a J. M. Voith Company water wheel with full automatic control designed to perform automatically and in proper sequence all of the operations of starting, running, and shutting down ordinarily performed by the station attendant in a manually operated station. By simply energizing the transmission line from the controlling power station, the wheel is started, the generator is synchronized, and assumes its load.

The equipment includes in addition to the usual protective device of a manually operated station, protection against sustained overloads, hot bearings, low voltage, underspeed, overspeed, and other irregularities usually cared for by the station attendant.

A similar equipment except of smaller capacity has been operating very successfully in a Toho Denryoku power station in Kyushu.

New Holt Liner for Far Eastern Trade

The new holt liner *Antenor* has just been launched by Messrs. Palmer Shipbuilding Co., of Jarrow-on-Tyne. She is the last of four specially built by this firm for the service between London and China. The *Antenor* will have accommodation for 100 first-class passengers. The carriage of frozen produce is being specially catered to as 20 per cent. of her cargo space is set apart for that purpose, the remaining 80 per cent. being devoted to general cargo requirements. Considerable satisfaction is being expressed in Liverpool, where the head office of the Holt line is situated, that a service between the Thames and the Far East will at last be controlled from that city (London).

The Penang Municipal Power Station

Some Notes on its Construction

Paper Read Before the Engineering Association of Malaya

By T. A. Owles, Assoc. M. Inst. C.E.

SOME 2½ yeare ago the Penang municipality foresaw the need of greatly enlarging their electric power supplies, the existing installation in Penang being out of date and insufficient for the rapidly increasing demands.

There being no suitable site in Penang, inland, owing to the impossibility of obtaining an adequate supply of circulating water and on the available ground on the foreshore, owing to excessive cost of long intake culverts for the circulating water, necessitated by a low muddy foreshore: a site further afield was therefore considered.

At this time the F.M.S. railways were proposing to erect and equip a power station at Prai for the supply of power and lighting to the new wharves there, and an agreement was arrived at between the F.M.S. government and the Penang municipality whereby the latter should build and equip the station at Prai, supply the current required by the railways and other probable users in province Wellesley, and convey current to Penang by submarine cable to the island.

The engineers for the electrical installation are Messrs. Preece, Cardew & Rider, and Messrs. Coode, Fitzmaurice, Wilson & Mitchell are responsible for the design and construction of the foundations, circulating culverts, and building.

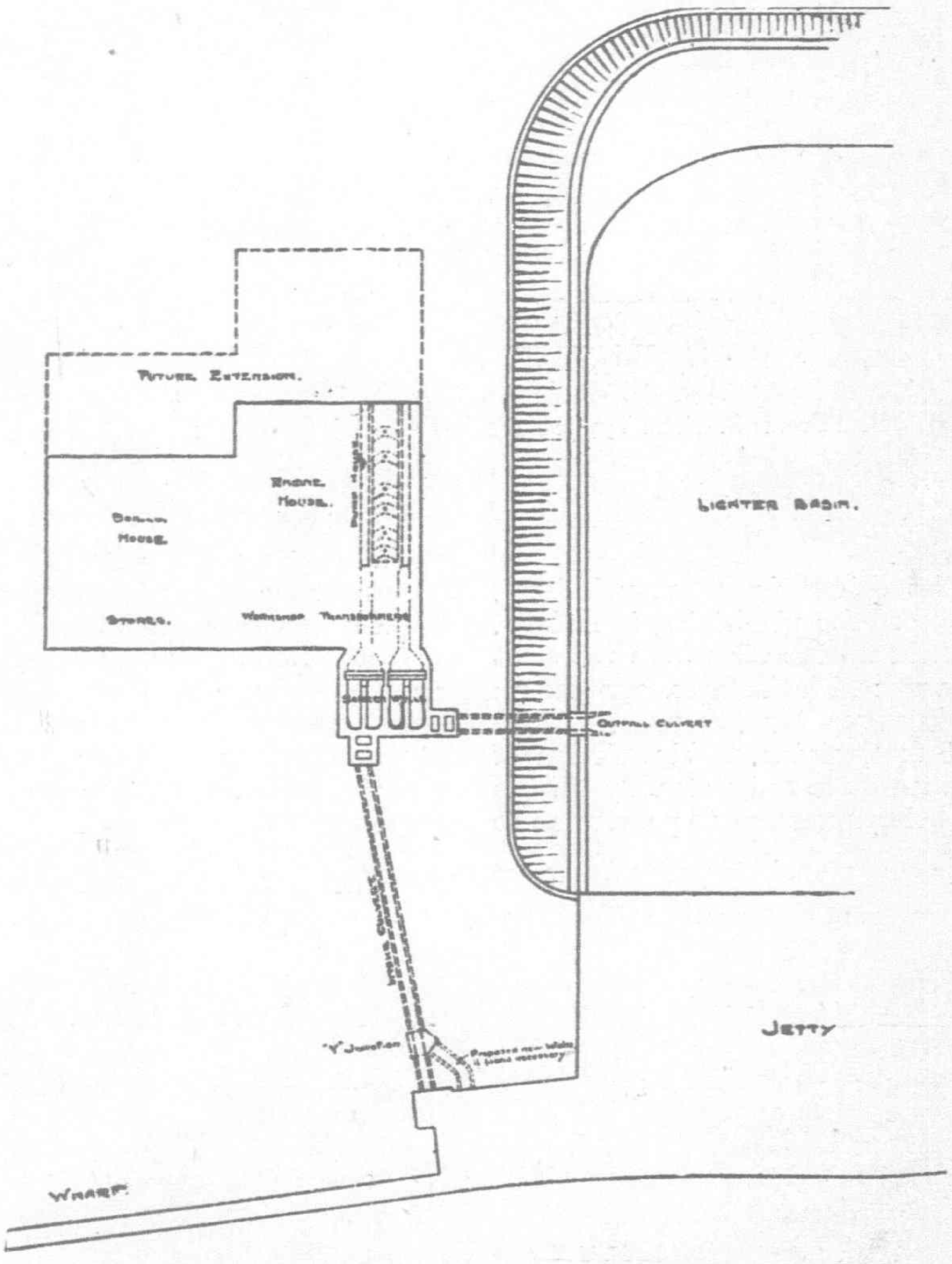
Situation

The site decided on was on the reclaimed ground at the east end of the lighter basin and an area of 70,000 sq. ft. reserved for the purpose; of this area about 24,500 sq. ft. are taken up by the first instalment now in progress of construction. This site is particularly suitable from the point of view of the circulating water supply, as comparatively short culverts give acess to the river through the wharf wall and to the lighter basin.

The first instalment of the installation now in progress consists of foundations and building for three sets of generating plant:—

(*a*) 1,500 K.W. Parsons set
(*b*) 3,000 K.W. do.
(*c*) 5,000 K.W.

with necessary boiler, coal bunker, stores, and transformer accommodation; pump wells for circulating water connected by culverts to the screen wells on the north end, which in turn are in communication with the lighter basin on the west, and the river on the north by pipe culverts.



General Plan of the Penang Municipal Power Station at Prai: Scale 120-ft. to an inch

The plans are prepared for a possible extension to take in a further 5,000 k.w. set and a 10,000 k.w. set.

Foundations

As the whole area of Prai consists of a layer of soft river mud 50-ft. to 60-ft. thick overlying a thick sand strata, the problem of supporting a building and machinery weighing about 20,000 tons needs careful consideration, as it is essential that the machinery should be on a rigid bed: it was therefore decided to carry the whole structure on reinforced concrete piles carried well into the sand.

Test piles were driven and later borings put down on the site and sand was found at a uniform level of 52 feet below L.W.O.S.T.

The test piles showed that a sufficient set could be obtained by driving 5 feet into the sand strata, and piles were designed accordingly: this necessitated piles of 70 feet length for the main building and 50 feet length under the pump wells, screen wells, and culverts.

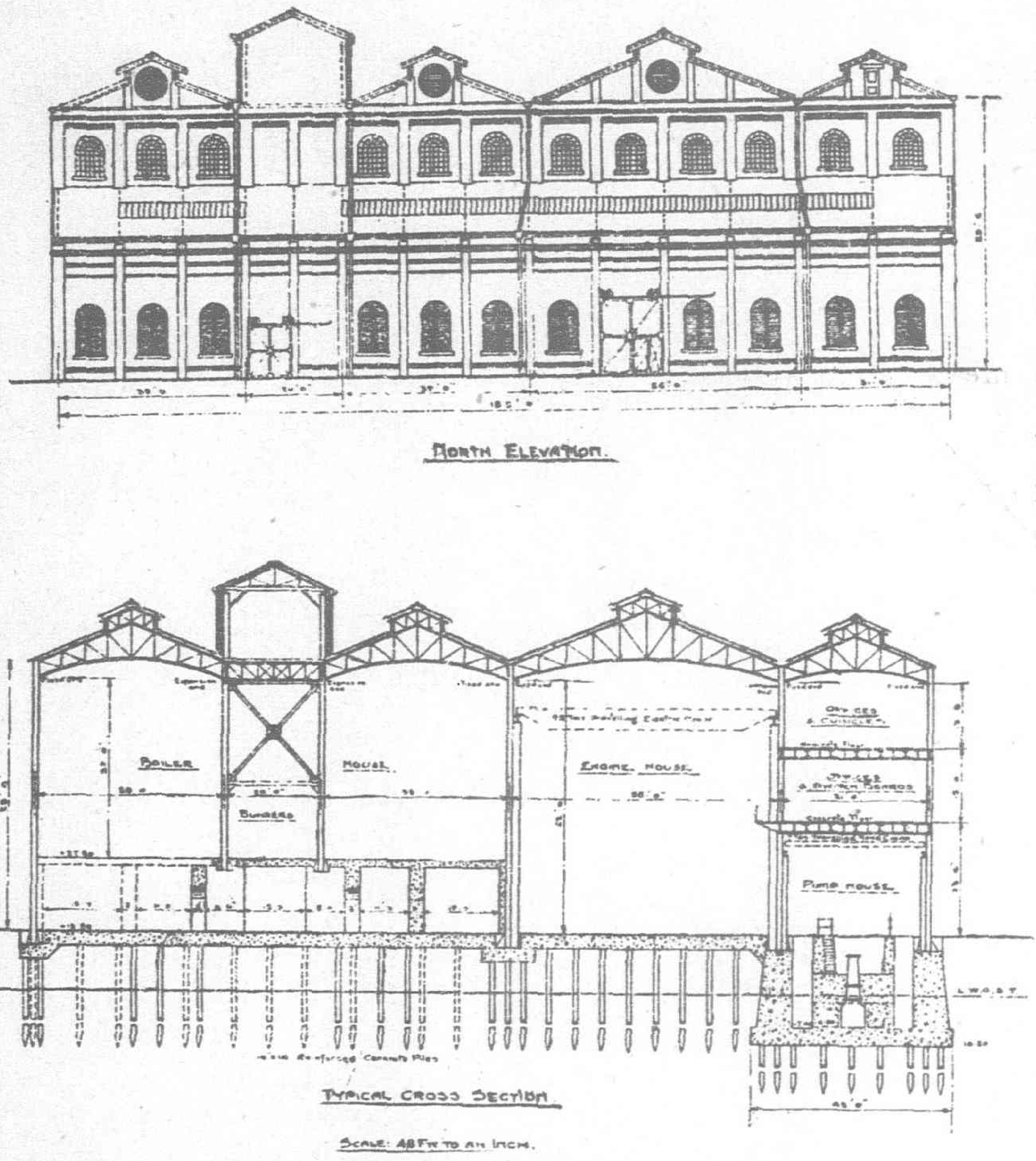
The calculated ultimate load which each pile will bear under a final set of ½-in. under a blow of a 2-ton monkey falling 5 feet is about 120 tons, and no pile in the foundation is loaded to more than 45 tons, and the majority to 30 tons and less.

The contract for the construction of the first instalment of the foundations, screen wells, and intake and outfall culverts was elt to Messrs. Topham, Jones & Railton, Ltd. on May 24, 1923, and work started on pile making as soon as steel arrived, and an average of 470 lin. ft. of pile made per day soon reached: the best week's work being 2,910 lin. ft. moulded.

Piles

Piles are made of the Hennebique type 14-in. square with 4 main bars 1¼-in. dia. for the 50-ft. length, and 1⅜-in. dia. for the 70-ft., kept in position with ¾-in. diagonal spreaders every 5-ft. 0-in. and with steel wire ¼-in. dia. links spaced 2-in. apart at ends, and 7½-in. at centre, and shod with a cast iron shoe. Owing to difficulties of transporting long lengths of steel bar, the main bars were designed in two lengths, to break joint near the centre; joints being staggered a minimum of 4-ft. 0-in.

The concrete in the piles is in the proportion of 2⅝ stone ⅝-in. and under; and 1⅓ sand to 1 cub. ft. or 90-lb. of cement; minimum cover over bars 2-in.



Prai Power Station: Typical Cross Section: Scale 48 feet to an inch

Piles were moulded on a level floor and remained on the mould bottom for 10 days when they were canted clear, not lifted; after a further there weeks they were lifted and stacked for a further period of a month before being driven.

The piles are transported to the site on cradles fitted on two flat trucks and supported every 5 feet, this being found more suitable than supporting them at the points of lifting only, owing to irregularities in the track jarring the piles and tending to crack them.

On arrival at the site the piles are handled by 15-ton double bond derrick cranes, specially designed for this class of work, which lift and rear the pile up vertical and place it in the leaders of the pileframe.

In the case of the 70-ft. piles a strongback or stiffener is bolted to the pile before it is reared up as the additional strain in bringing it to the vertical position was found to develop slight cracks.

In driving, the heads are protected by a M. S. helmet packed with old rope and belting and fitted with a short timber dolly; this has proved very effective and the pile heads are quite undamaged after severe driving.

In the case of the 70-ft. piles driven from ground level, which is incidentally, I believe, a record for piledriving in Malaya, the crust of red earth and filling hold up the piles from the start and they have to be driven all the way: with the 50-ft. piles driven from the bottom of the trenches however, the pile when pitched penetrates the mud from 8 to 15 feet, giving a skin friction of about $1\frac{3}{4}$ cwt. per sq. foot: they then drive quite steadily till the sand level is reached, hard driving being necessary to penetrate the sand crust which once penetrated gives an average of $\frac{1}{2}$-in., penetration per blow.

Wooden chocks bolted into the pile were tried, but it was found impossible to make these penetrate the sand without excessive punishment to the pile, and they were abandoned.

The final set obtained on piles varies from $\frac{1}{4}$-in. to $\frac{1}{16}$-in. per 5-ft. 0-in. blow of a 2-ton monkey. Tests carried out by loading a group of 4 piles with C. I. Kentledge two weeks after driving showed that with a load of 180 tons (45 tons a pile) a settlement of $\frac{1}{8}$-in. to $\frac{3}{16}$-in. took place, and on increasing this load to 240 tons (60 tons a pile) a total settlement of $\frac{1}{4}$-in. to $\frac{9}{16}$-in. occurred; settlement ceasing 12 hours after the load was applied.

A further test of redriving three piles was made which gave very satisfactory results; these piles had been driven one month previously with sets of $\frac{13}{16}$-in., $\frac{9}{16}$-in. and $\frac{7}{16}$-in. per blow, and after 20 blows gave sets of $\frac{1}{21}$-in., $\frac{1}{42}$-in. and $\frac{1}{84}$-in. showing that the skin friction of the mud is quite a valuable asset in the supporting power of the piles.

The foundations for the first instalment of the building itself consist of 424 piles 70-ft. long, driven from ground level, covered with a mattress of 7 to 1 concrete in mass 3-ft. 6-in. thick, in which the top two feet of the piles are embodied: 18-in. of the steel being bared and bent over to obtain a good bond.

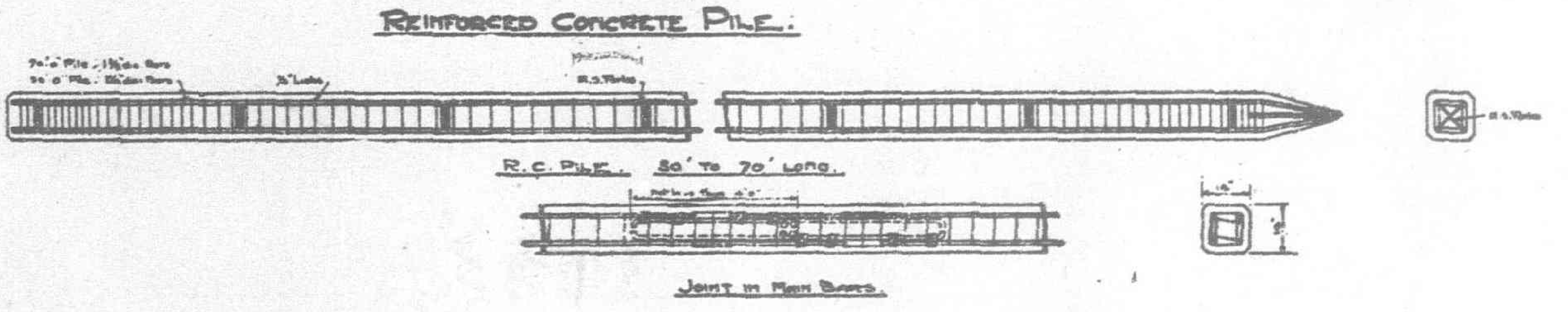
Under all walls these foundations are stepped down 3-ft. 0-in. below the general floor level to allow for the stanchions and footings of the brickwork filling.

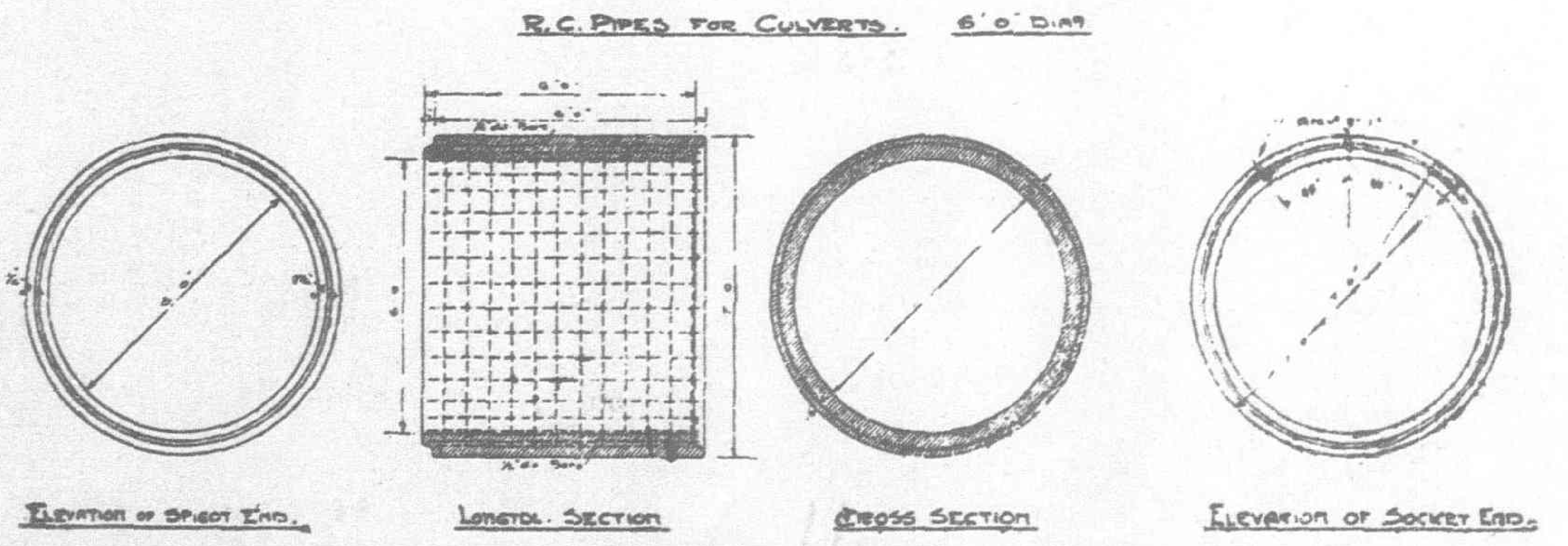
The whole area being covered with a 3-in. layer of granolithic concrete after the erection of the building.

The building is of a heavy steel frame structure, with brick filling to the walls, and corrugated iron roofing with ample glazed areas for lighting purposes: it consists of five spans, that on the west side over the pump wells having two upper stories for offices and quarters for the staff. Next to this is the engine house of 56-in. span, this being equipped with a 25-ton overhead traveling crane.

The boilers are arranged in two rows separated by the coal bunkers, for which all arrangements are being made, although for a start oil fuel is to be used.

The north end of the building has a lean to addition covering the transformers, stores and workshop: railway access being provided for by a short spur from





Scale $\frac{1}{2}$ inch to 3 feet

the F.M.S. railway lines leading on to the jetty.

The whole building is surrounded with a concrete drain, leading all storm water from the building into the lighter basin.

The south end of the building is closed with a semi-temporary screen end to allow for future extensions.

Pump Wells and Screen Wells

The pump wells, coming under the west span of the building, consist of three parallel walls of concrete, built on a similar mattress of concrete, capping 50-ft. piles driven into the sand.

The spaces between the three walls forming the culverts for the circulating water; these culverts being arched over under the transformers and leading into the screen wells.

The centre wall is designed with cross culverts connecting the two main channels fitted with sluices at both ends, so that either channel may be used as intake or discharge.

This centre wall forms the seating for the circulating pumps themselves; tapered cast iron pipes passing through the floor of the pump well proper, into the cross culverts.

As the floor of the pump room is only 4-ft. 3-in. above low water, the necessity of keeping these watertight is essential. This is achieved by a 1-in. layer of Seyssel asphalte being incorporated in the concrete floor, this being brought up into the light side walls enclosing it: these walls being only 2-ft. 0-in. thick some experiments were made to obtain a dense waterproof concrete: tests were made with short cylinders of 3 to 1 concrete, with and without the addition of "Pudlo" and Ironite, briquettes being also made for tensile tests.

Results showed that a properly mixed and graded concrete of such rich proportions was preferable to a similar mixture with the addition of either 3 or 5 per cent. of "Pudlo" both for strength and imperviousness. The specimens with an addition of 20 per cent. of "Ironite" however gave almost as good results as the plain concrete, and in the briquettes showed an increased tensile strength to cement: the best use for this material, however, seems to be for a surfacing of floors, as a slurry of one part "Ironite" to three parts cement laid on to a granolithic floor when still green, undoubtedly gives a much stronger wearing surface, the skin of ironite and cement being quite difficult to scratch.

The screen wells consist of a concrete chamber divided into four compartments by light concrete baffle walls; with accommodation for four revolving screens, two of which are being installed at present.

The culverts consist of 6 feet internal diam. reinforced concrete pipes 6 inches thick cast in 6-ft. 0-in. lengths with a spigot and socket joint: these are laid on moulded concrete seating blocks set on a 2 feet mass concrete bed capping 50-ft. piles driven in pairs at 6 feet intervals.

Joints are grouted up through holes moulded for that purpose and concrete deposited round the pipes to keep all in position.

In the river culvert some trouble is anticipated at the back of the abutment where the culvert has already been built in the blockwork: the backing and foundation of the wall consists of heavy rubble and though this was kept down to allow for the linking up of the culvert later, it is expected that a length of this will have to be done under water as it will be very difficult to get a water-tight trench on this stone, and also to drive the supporting piles through it.

To overcome this, the design has been slightly altered; piles being omitted and a heavy bed of richer concrete deposited on the rubble; pipes then laid and the whole covered with concrete in mass.

The actual intake for this culvert consists of a tunnel 5-ft. 6-in. wide 7-ft. 6-in. high built in the blockwork during the construction of the wharf, this leads into a vertical shaft in the back of the abutment, covered with a chequer plate cover and fitted with a heavy galvanized grid.

The culvert to the basin is taken out direct through the rubble slope and the outlet consists of a 20 feet length of mild steel pipe covered with concrete and fitted with a heavy steel grid.

Either culvert may be used as intake as the arrangement of sluices in the pump wells permits the drawing of water from either source of supply.

The whole of the concrete in the walls and floors of screen wells and pump wells is of 7 to 1 mixture, with a 6-in. facing of 4 to 1 fine concrete brought up simultaneously with the 7 to 1.

The 7 to 1 was graded in the following proportions:—

Stone $1\frac{1}{2}$-in. to $\frac{5}{8}$-in.	5.6 c. ft.
Sand	3.1 c. ft.
Cement	1. c. ft.

The 4 to 1 fine concrete:—

Stone $\frac{5}{8}$-in. to dust	4. c. ft.
Cement	1. c. ft.

This stone, screened from the crusher run was found to contain 42 per cent. below $\frac{1}{4}$-in. to dust and the voids amounted to $36\frac{1}{2}$ per cent.: the fine concrete, therefore, required no sand added to make a very dense concrete.

The concrete deposited under water, below the culvert pipes is of 4 to 1, and around and over them, of 6 to 1: this will be deposited in skips with double doors opening outwards to avoid washing of cement from the aggregate.

A few remarks on the difficulties so far encountered may be of interest: all the excavation for the pump and screen wells and culverts having to be carried down to 10-ft. 6-in. below low water, the whole has had to be done inside close sheet piling. In the case of the pump wells, a width of over 42-ft. had to be removed and the timbering for such a trench would have been very heavy and would have prevented the driving of the piles in their correct positions.

The whole area of the pump and screen wells was divided up into six separate trenches of an average width of 23-ft. 0-in. and these excavated in rotation: even with these precautions a lot of trouble was experienced with the first two trenches; considerable settlement occurred, combined with a tendency for the bottom of the trench to close in, and 14-in. by 14-in. timbers began to crack in an alarming manner. Extra timbers were put in and no further trouble experienced; piledriving and concreting being successfully carried out.

A further source of trouble has been the discovery of two or three old tongkangs buried in the mud under the area of the main building, and it was found impossible to drive the 70-foot piles through them as the timber is in a well preserved state: these are being exposed and removed when piling will be completed.

Equipment

A few words on the plant which is to be installed will no doubt be of interest.

The first instalment as at present being constructed is capable of accommodating:

One 1,500 kilowatt turbo-generator
One 3,000 do.
One 5,000 do.

making a total of 9,500 kilowatt, and provision is made for extending in the future for a further 5,000 and 10,000 k.w. sets.

The boiler houses are arranged to house five boilers, these being of the Babcock & Wilcox water tube marine cross drum type, each evaporating 32,000-lb. of water per hour and generating steam at 170-lb. per sq. in. press.: provided with a self-contained super-heater having tube heating surface of 1,266 sq. ft., and feed water heater with tube heating surface of 2,566 sq. ft.

A complete oil-burning plant is to be provided and the boilers also equipped with mechanical stokers of the continuous traveling chain grate type which will be capable of efficiently burning small Malayan coal: effective grate area 224 sq. ft. per boiler.

A steel chimney stack complete with induced draught fans is arranged for each bank of two boilers.

The first 1,500 kilowatt machine had been ordered before it was decided to change the Penang system from direct to alternating current generation and it was designed to run as a direct current machine through reduction gearing: as it was too late to alter the design of the turbine it was decided to instal a slow speed alternator to replace the direct current machine and instal a second turbine of 3,000 kilowatt capacity.

These machines will generate alternating current at 6,600 volts 3-phase 50-cycles per second and fed direct into step-up transformers which raise the voltage to 11,000 volts for long-distance transmission.

The circulating pumps to the condenser are of the horizontal centrifugal type, coupled direct to electric motors: the 12-in. diam. pump being capable of delivering 2,750 galls. per minute.

Malaya's Hydro-Electric Scheme

IT has been known for some months that a representative of Sir W. G. Armstrong, Whitworth & Company, Ltd., has been investigating the possibilities for furnishing the mines in the Perak district of Malaya with electric power derived from the South Perak River. This expert, Mr. F. Bolton, former electrical adviser to the F.M.S. government, has completed his studies and is now on his way home. Before leaving Malaya he furnished *The Malay Mail* with a very interesting outline of the project whose realization seems to depend largely upon the willingness of the F.M.S. government to guarantee debentures amounting to $20,000,000 (silver). The home government at London has approved the scheme but the F.M.S. authorities having been called upon to make good its guarantee on other ventures is inclined to be shy of any new proposition that might increase its financial burden.

In commenting upon the scheme *The Malay Mail* points out that in Tasmania the government carried out a very extensive hydro-electric scheme without any demand for power at all, later advertising the power for sale and succeeding in attracting applications sufficient to justify the foresight of the government. In Perak are located the richest alluvial tin fields in the world and a prosperous and prospering industry on which the government depends largely for revenue and a fair section of the population for a living. An enormous amount of capital has been sunk in the industry, and the extent to which it may progress in the future is yet unknown, but it may be said with some degree of certainty that for another half a century at least the tin fields of Perak will not be exhausted. Like all other industries, modern machinery has revolutionised the tin industry in Malaya and every year more machinery is being installed. That machinery requires power to be driven, and at present the power is obtained by expensive and in many cases unreliable methods. The timber resources of the country are being heavily depleted to supply a part of that power, giving serious anxiety to those who have to conserve those resources. It would, therefore, be a boon to the industry if it could secure all the power it required cheaply, regularly, and from a reliable source. The most important benefit it would bestow on the industry would be the saving of a very large sum of money annually—a sum which cannot be stated definitely but which would be sufficient, in many cases, to double the dividends which are now being paid and to increase the royalty which the government is now receiving considerably. The source for such power has been discovered in the Perak river which is situated in a very favorable position so far as the Perak miners are concerned. The scheme is to establish a hydro-electric plant on the Perak river and to supply power to the mines in the Larut, Kinta, Kuala Kangsar, and Batang Padang districts.

One of the first things which Mr. Bolton did was to ascertain the demand for power which would exist if a cheap supply were available. He circularised almost every mine in the Larut and Kinta districts, and the applications for cheap power which he received astounded him. The minimum which would have to be supplied amounted to a round hundred million units per annum, which is very little less than the actual demand in Manchester. Mr. Bolton found out by further enquiry that if the power became dearer the demand would be considerably reduced. Cheap power can only be supplied to the industry if the company which will be formed ultimately to undertake the scheme can raise the money it requires on cheap interest. Power would be comparatively dearer, by about 65 per cent. roughly, if the money could not be so raised. The capital of the company would have to be so large that it is unreasonable, in the present state of the money market, to suppose that the whole of it could be raised by the issue of ordinary shares.

Mr. Bolton thinks that if the full demand for power is to be satisfied they would have to form a company with a capital of $25,000,000, $20,000,000 of which would have to be raised on debentures and the balance in ordinary shares. He is aware that although it is difficult to attract new money for ordinary shares, there is a large amount of money in England awaiting safe investments, that is to say investments which would give sure returns though they may be comparatively low. The whole of the $20,000,000 required for the Perak hydro-electric scheme, in Mr. Bolton's opinion, could be easily raised from these sources if government would guarantee the interest on the debentures. Four or five years ago a guarantee would have been impossible, but the imperial government passed the trade facilities bill in order to help on the development of the dominions with borrowed money. What the sponsors of the Perak scheme ask is a guarantee only, but the home government has been ready to go much further, and has actually gone much further in the case of one Malayan tin company. In connection with the trade facilities bill the secretary of state sent a despatch to all the crown colonies, protectorates, and dominions, some time ago. One paragraph in that despatch is as follows :—

> "In order to facilitate the anticipation of public utility works such as communications, power, lighting, water, etc., which otherwise would not be undertaken for some years, the imperial government proposes to give contributions towards interest charges on loans raised for capital expenditure of this description. These undertakings may be under either public or private control or management. Assistance would be in respect of expenditure or orders placed in Great Britain and would be applicable only to schemes approved by the local government and certified to be in anticipation of normal expenditure. It is proposed that the maximum assistance given should be a free grant of three-puarters of the interest charges for a period of five years. To qualify for the imperial contribution the scheme must be accepted by the imperial government within the next three years. Approval of the imperial government would be given after consultation with the treasurer, the colonial secretary and the board of trade. Priority would be given to schemes involving the earliest placing of orders."

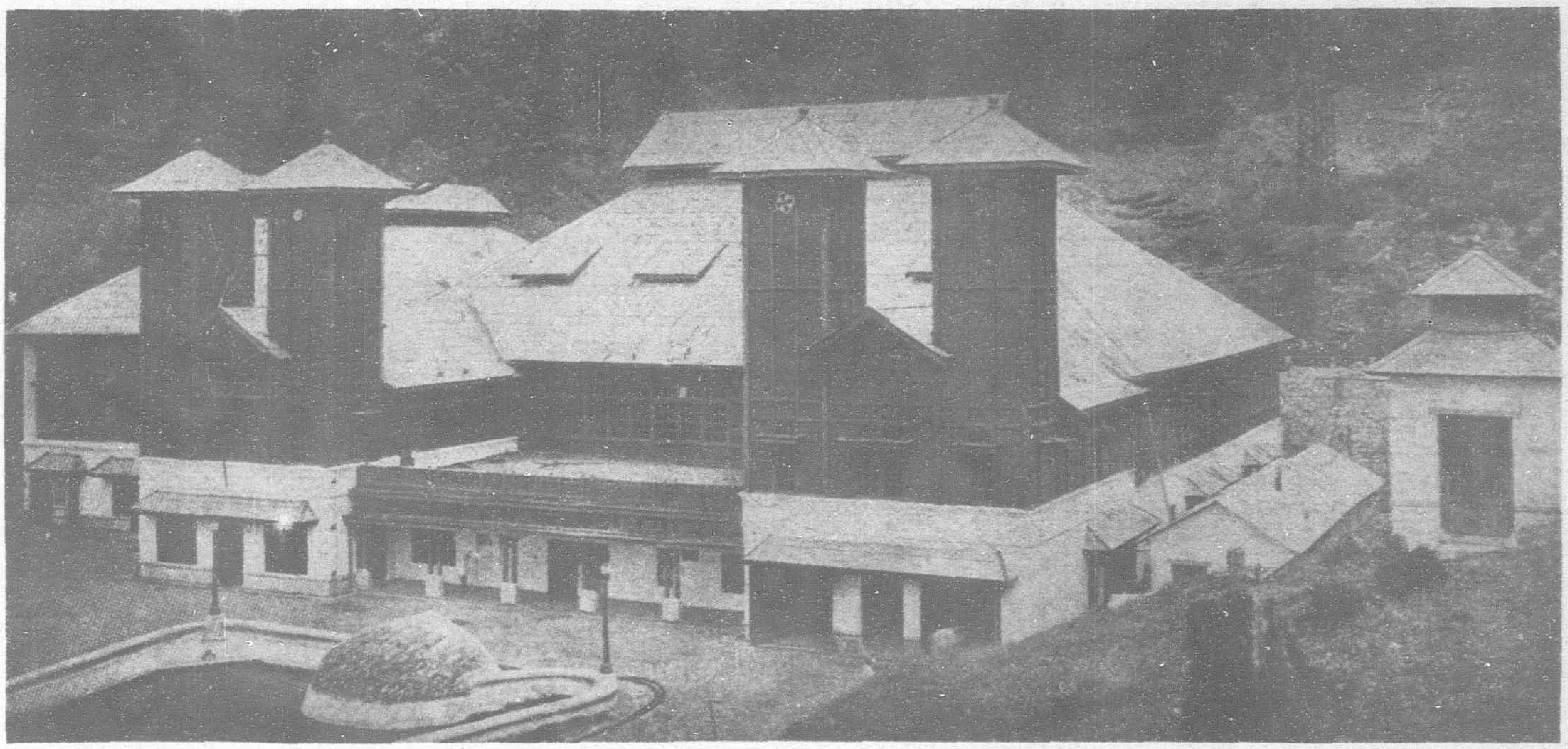
Ceylon has already taken advantage of this concession in respect of its hydro-electric scheme.

It is fortunate that the one large source of water power in Malaya which can be developed commercially, occurs close to the most important centres of mining activity, Kinta and Larut. While carrying out his enquiries in 1920 on behalf of the government Mr. Bolton found that the estimated amount of power used in 1919 on the mines in these two districts alone, if converted into electricity, would be sufficient to supply twice over the full demands for electricity for domestic use to the whole of the rest of an electrified Malaya. If all the tin mines in Kinta and Larut were electrified and worked as in 1919 the amount of electricity used on the mines would be over half of the full amount estimated for all purposes in all towns and other districts of importance in the country. It is estimated by Mr. Bolton that the consumption of electricity in Kinta would be three times that in Larut, and as it appears that the mines in Kinta will have a life of at least double those of Larut, it indicates how very important the Kinta district is. Mr. Bolton has drawn up the scheme to embrace Kamunting and Taiping in the north-west to Tapah in the south-east. Mr. Bolton now thinks, after close investigation, that the Perak river can be harnessed to produce sufficient power to supply electricity to meet all the present and probable future requirements of Kinta and Larut by building one dam across it. To show how the demand for power has increased during the last four years it may be noted that in 1920 Mr. Bolton was of opinion that if all the mines in Kinta and Larut were electrified, which at present burn fuel to produce power, the amount of electricity consumed would be about 60,200,000 units. Now he finds that the European mines alone will require and take 65,000,000 units per annum if cheap power were available.

Although the guarantee which it is asked to provide might be nominal the local government will be responsible to the public for the risk which it undertakes in providing that guarantee. Therefore it is bound to act with caution. The natural question is whether the benefit which the country at large and the mining industry will derive will be immeasurably greater than anything that the government stands to lose by undertaking the risk. Mr. Bolton has proved to the best of his ability that a keen demand for cheap power exists to-day and that the scheme is bound to be a success. It is quite plain after the loss of millions by the F.M.S. government in the muddy waters of Prai its advisers are to accept any responsibility for a course of action which might result in further loss to government.

One of the strongest assurances that the government will have that the scheme will be carried out fully and effectively is the interest that Armstrong, Whitworths are taking in the project. They have wide and vast experience in similar and bigger undertakings elsewhere and are not likely to bring discredit to their name by butting into a scheme which will not be a credit to their enterprise.

Mr. Bolton thinks that even if the guarantee is forthcoming when he arrives home it would not be possible to start real work on the Perak river for about a year, which time would be spent in getting together the material, staff, the formation of the company, and other preliminaries. About three years would be taken for the completion of the work. Of the total capital to be raised he thinks that about half would be spent in England on machinery, etc., and a good portion of the balance in Malaya, etc. The laying of the transmission lines which he thinks would come to about 60 miles would cost a considerable amount of money in the way of wages to laborers. The area embraced by the whole scheme is roughly from 600 to 800 square miles.



High Power Radio Transmission Station at Malabar, near Bandoeng, Java

High Power Radio Station in Java

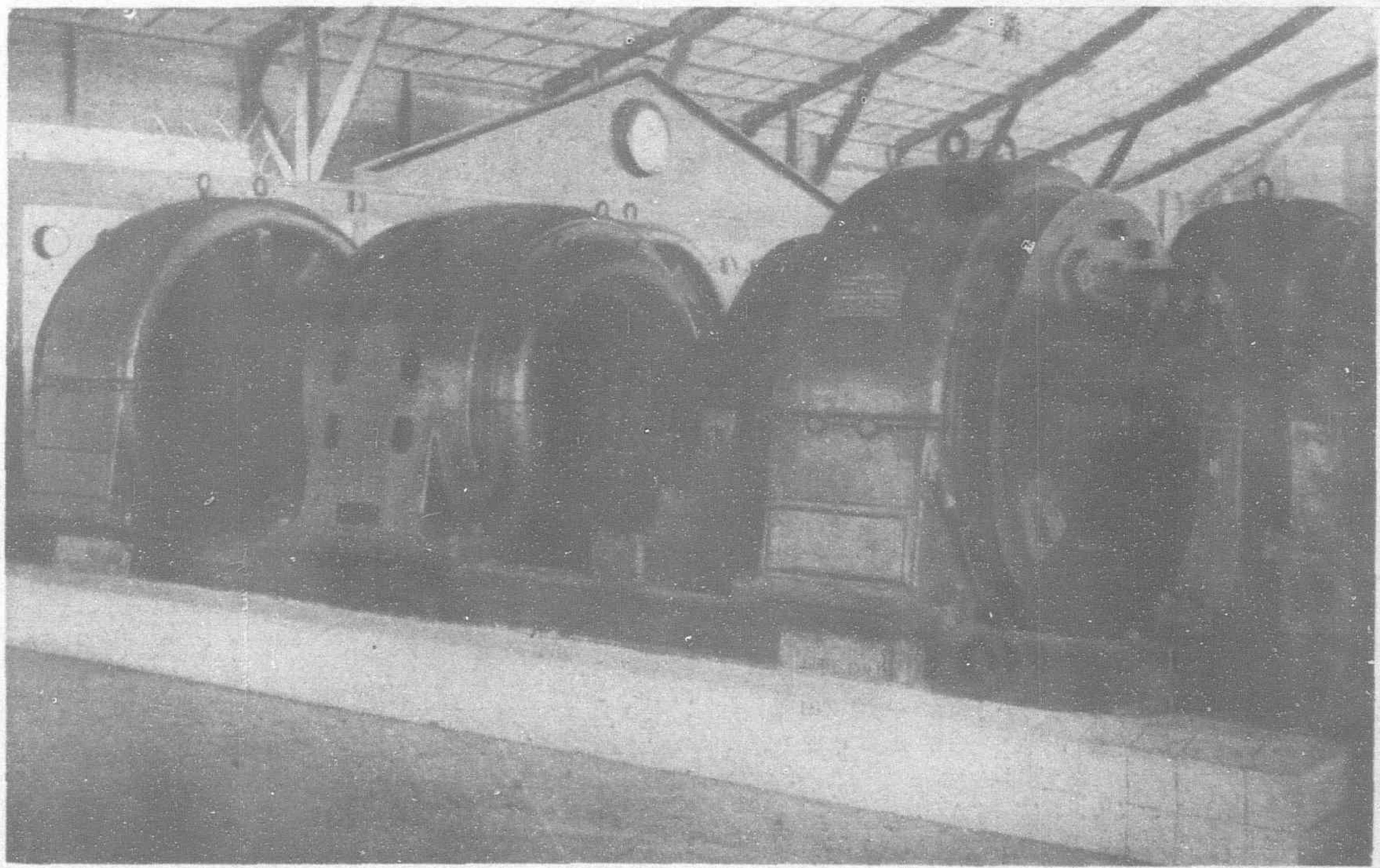
AT Malabar, near Bandoeng in the island of Java, there is one of the world's most powerful radio transmission stations. It was installed for the purpose of insuring direct communication with Holland, the mother country, and is capable of radiating a continuous wavelength of from five to twenty kilometres.

The Poulson arc system is used and the equipment of the power plant includes, at present, two motor-generator sets of twelve hundred kilowatts each. Each set includes an induction motor rated at 1,760 h.p., 6,000 volts, 50 cycles, driving two 600-kw., 1,500-1,750-volt direct-current generators, connected in series.

The two motor-generator sets are operated in parallel to supply 2,400 kw. to a Poulson arc generator, which is the largest in the world, and was produced entirely in the Dutch East Indies in accordance with the design, and under the supervision of Dr. C. J. De-Groot, the chief of the Dutch East Indian wireless department. Two additional motor-generator sets, duplicating the above, are now being built. One of these will be kept as a spare, but the other will be used in parallel with the first two sets to give a total energy at the arc of 3,600 kw. and a high frequency radiating energy of 1,800 kw. from the antenna.

All the motor-generator sets with switchboard, transformers, aluminium arresters, high speed circuit breakers of the JR type, Hewlett insulators and high voltage wall bushings are of General Electric make.

The antenna is suspended from steel cables between two mountain sides, about two miles apart, and hangs two thousand feet above the station.



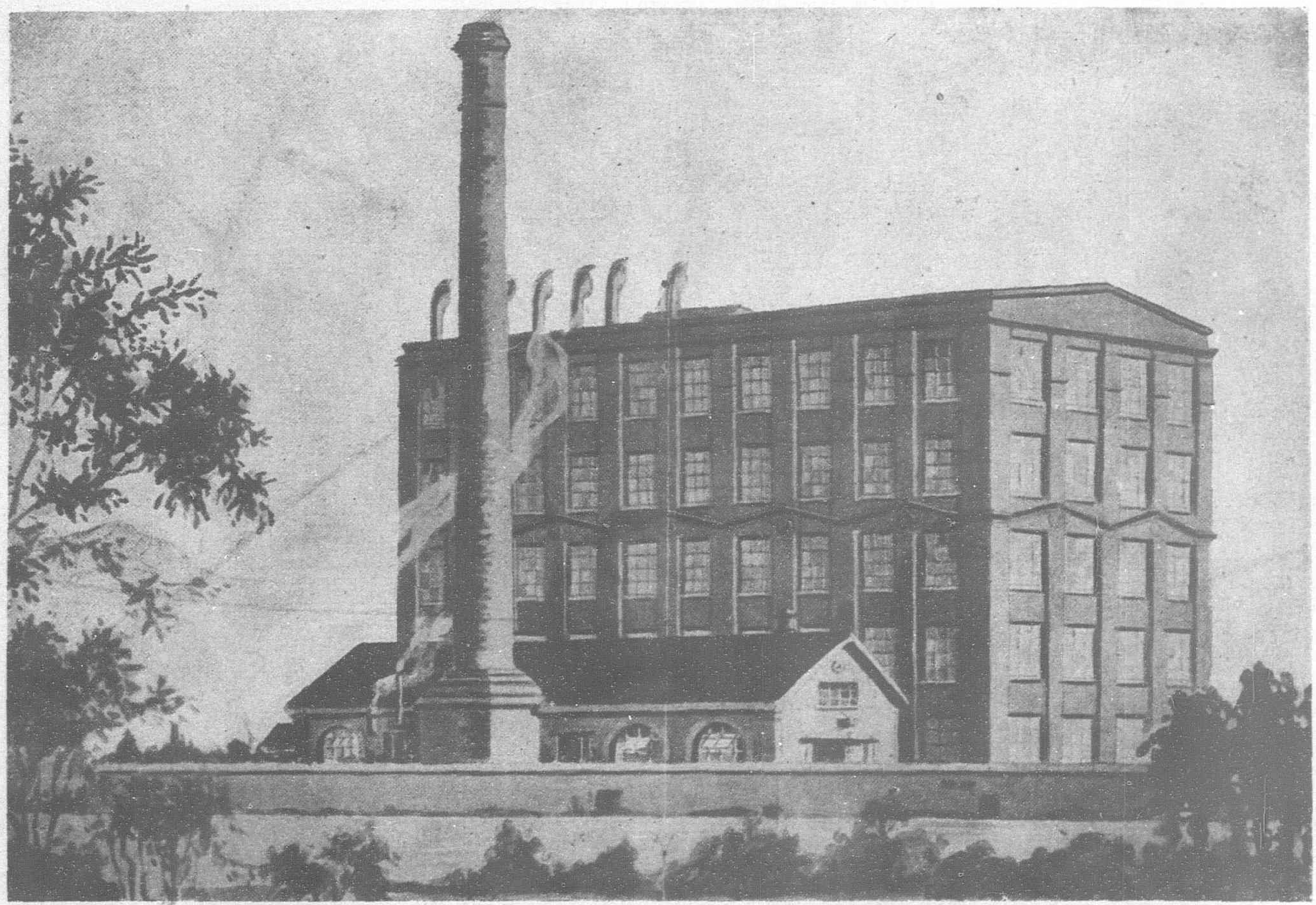
One of the 1,200 K.W. General Electric Motor Generator Sets at the Malabar Radio Station

Advance in Flour Milling in China

New Modern Mill at Tsinanfu Equipped with Unique Milling Machinery

CHINA is rapidly taking its place among the flour producing countries of the world. There are already a number of fine mills of large capacity located in different parts of the country and from present indications many new mills will be built in the future.

These flour mills are all of the latest design and construction and are completely equipped with modern machinery. China has gone into milling whole-heartedly and for this reason the art and methods of flour milling have advanced to a much greater extent than any other single line of industry carried on in this country. This fact can be credited mainly to the foresight and ability of men of high calibre and business integrity such as Miao Yin-tsin and Miao Sing-yuen of the Chen Foong Flour Mills Company, the main office and plant of which is situated at Tsinanfu, China.



CHEN FOONG FLOUR MILLS at Tsinanfu.—Capacity 1,300 Barrels Per Day; Designed by the Robinson Manufacturing Company, Jardine Engineering Corporation, Agents

The Chen Foong Flour Mills Company was organized during the early months of 1922, by Messrs. Miao Yin-tsin and Miao Sing-yuen together with a number of their associates. They immediately laid plans for the construction of a complete and modern flouring milling plant with a capacity of 1,300 barrels of wheat flour per day. The plans included the main office, godowns, mill and power plant. The contract for the entire mill equipment was awarded the Robinson Manufacturing Company, of Muncy, Pa, through their agents, Messrs. Jardine, Matheson & Co., Ltd., of Shanghai, China. The complete plant was designed by the Robinson Manufacturing Company's staff of engineers and the installation was supervised by their special milling engineer and representative. The plant has been in continuous operation for nearly a year, producing very satisfactory results and permitting the company to market products that have created a large demand.

Miao Yin-tsin is managing director of the company and establishes the business policy of the concern. He is a native of Shantung province and is a very influential and highly respected citizen. His regular business is that of grain merchant and buyer of Chinese produce. That he is a very capable executive is shown by the amount of business he transacts, that of handling peanuts alone amounting to over $5,000,000 during the year 1922.

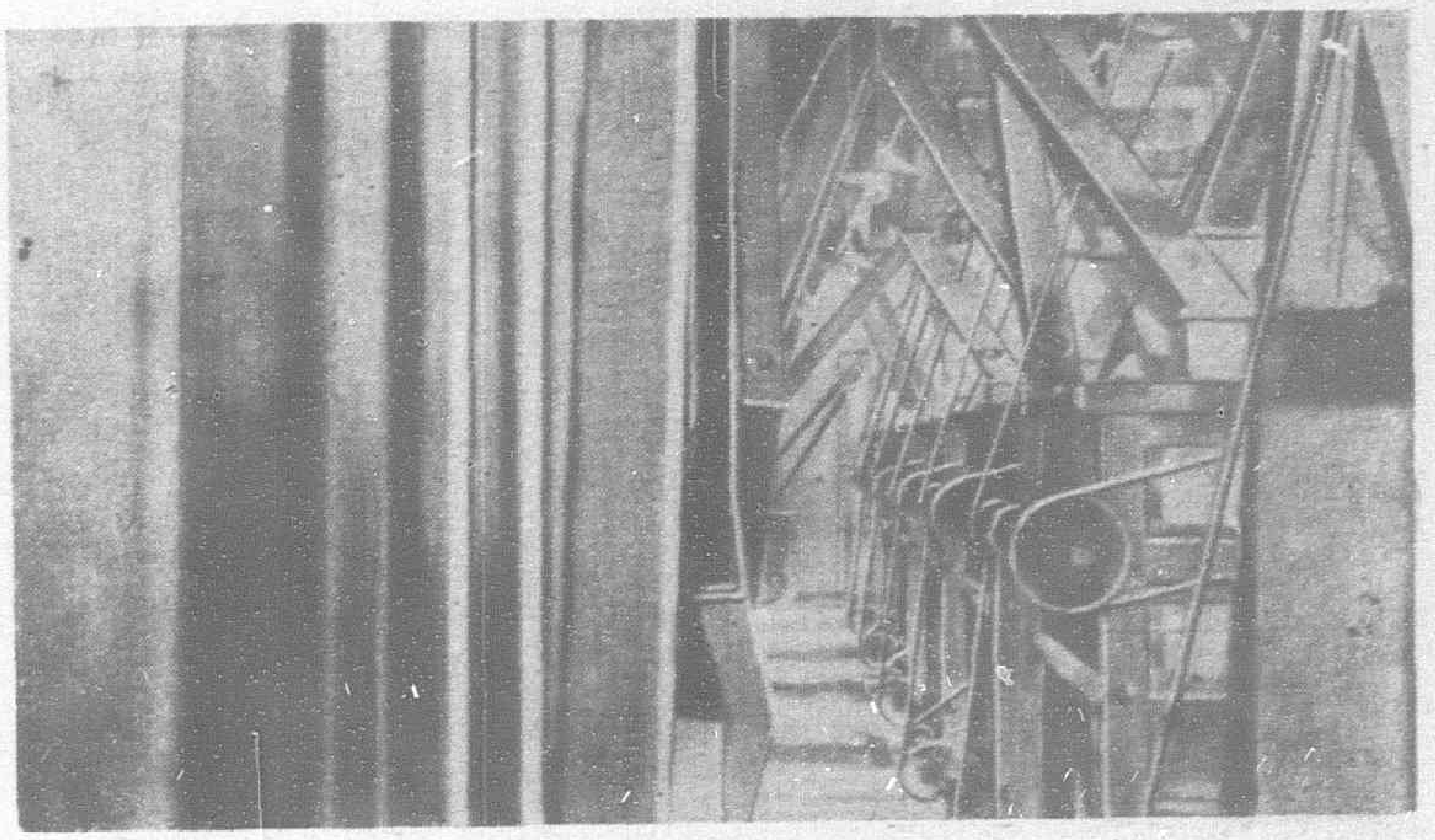
Miao Sing-yuen is business manager of the flour mill. Before taking over the managership, he also was very active in the grain business. He was a very notable figure in relief work during the recent famine and is held in high esteem by his countrymen. He is a very keen student of modern methods of flour milling and is at all times in close touch with the operations of every department of the mill.

In addition to the ability of these men, the company has the financial backing and able support of a number of shareholders who were selected from among the leading and most successful business men of the community. They all show a pronounced interest in the new milling venture. It is safe to say that with such men to carry on the business, and with the mill equipped with an entire line of Unique machinery, the Chen Foong Flour Mills Company is assured of a long and successful career.

After the organization of executives and shareholders, and the selection of high-grade equipment, comes the very important problem of selecting a suitable crew, and in this the managers have shown unusual ability and foresight. Through their thorough acquaintance with the milling field in China, Miao Yin-tsin and Miao Sing-yuen have been able to assemble a crew of experienced millers and helpers who will materially aid the progress and success of the business.

The office of the concern is large and spacious and is very elaborately decorated in accord with the Chinese style of architecture. On the first floor are three private offices, a large general

A Section of the Bolting Floor



Some of the Purifiers

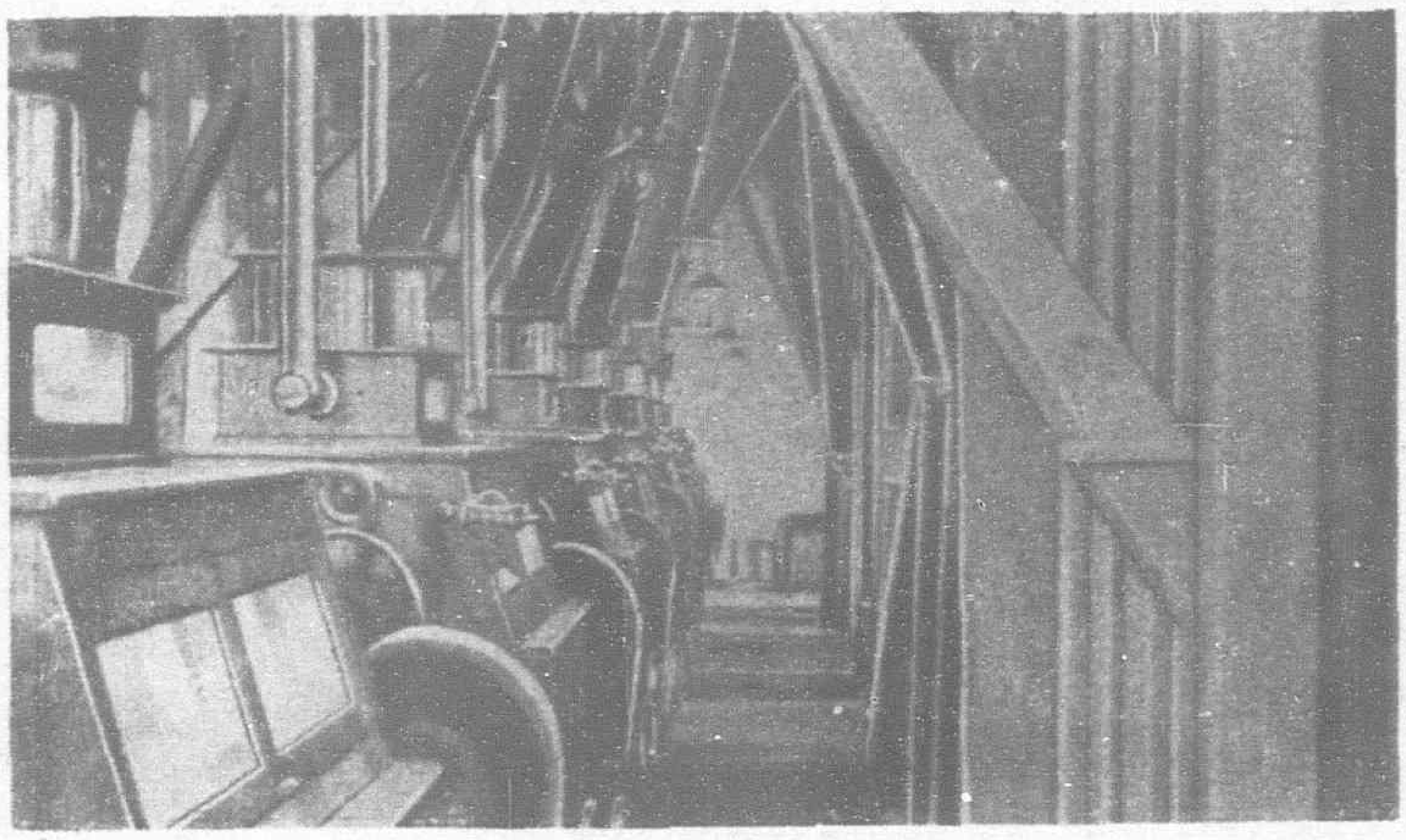
office and a sample room. The second floor is composed of a commodious general reception and dining room for large gatherings of shareholders and friends, and a private office for the milling engineer. On both ends of the second floor will be found large dormitories used as sleeping quarters for the office employees which is customary in large Chinese business offices.

The mill is of brick construction consisting of five stories and basement and has a capacity of over 1,300 barrels of flour per day. Plans for machinery installation and flow sheets were prepared by the Robinson Manufacturing Company and specified a complete line of Unique machinery. It is hardly necessary to enumerate all machines included in the specifications so we will merely mention that the grinding floor is divided in two units made up of 13 stands of 9 by 30 and six stands of 9 by 36 Unique collar oiling double roller mills of latest design. The bolting floor is also divided into two units and is made up of seven Unique self-balancing ball-bearing sifters with level sieves. The purifiers, reels, bran dusters, packers, dust collectors, etc., are all arranged to conform to the high standard of quality and efficiency for which the Robinson Manufacturing Company is noted. The mill is a model of efficiency throughout and adds credit to American-made milling machinery. In fact, the mill made such a favorable impression in Chinese milling circles that another contract for complete Unique equipment for a 1,000-barrel wheat flour mill and a 2,500-bushel corn mill has been awarded the Robinson Manufacturing Company.

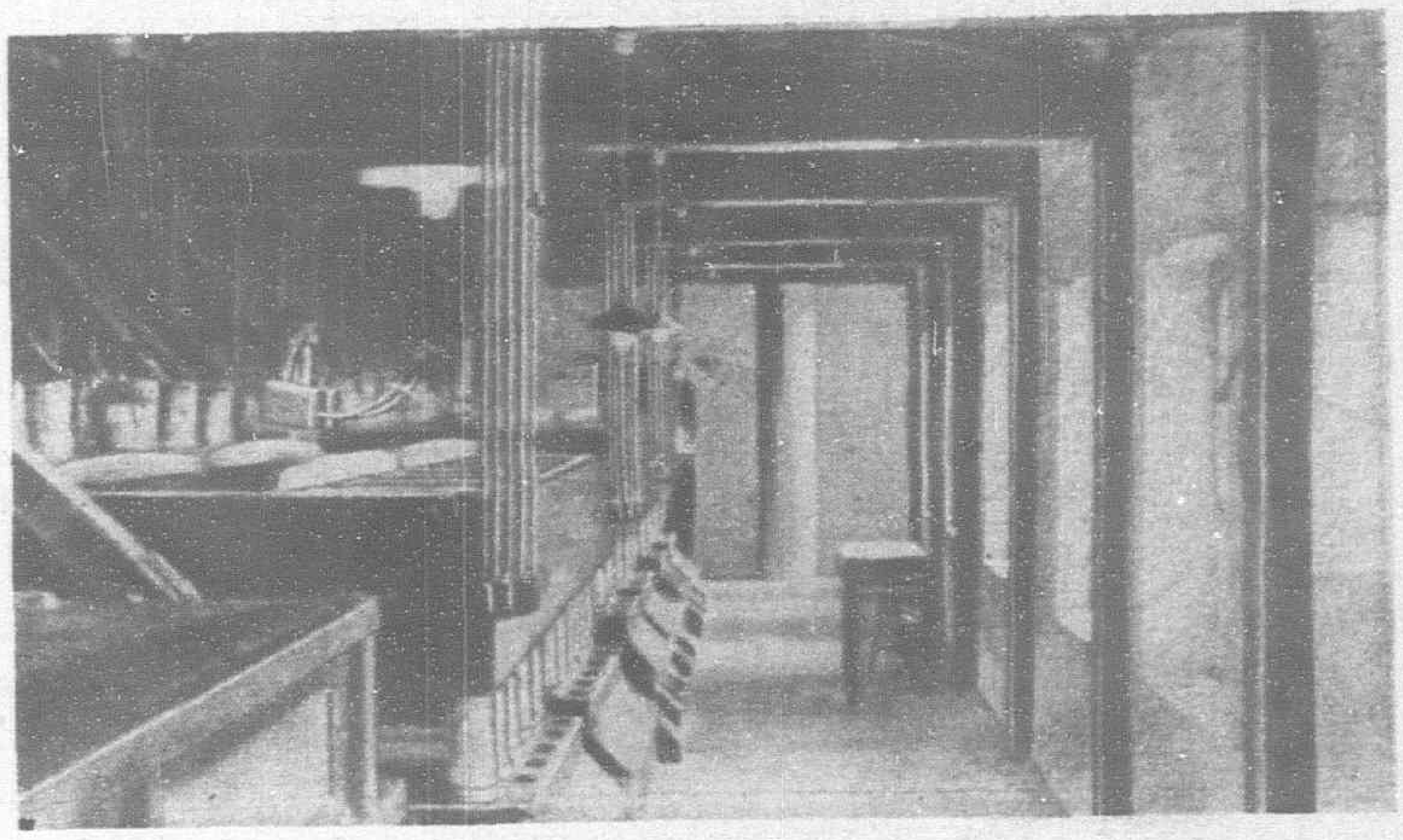
Although the art of milling in China is being modernized by leaps and bounds, other activities such as the raising of wheat, threshing, and delivery of wheat to the mill are carried on in much the same manner as they were done by the ancients. We show a number of interesting scenes photographed by the company's representative during his travels, which will give an idea of how these activities were carried on. The methods used by the Chinese will probably strike the average American miller as being very inefficient (and so they would be in America), but in China, with a surplus of labor to draw from and with a pronounced lack of modern machinery, they are considered most economical and efficient.

Flowing is done by means of mixed teams such as donkey and ox, and often a Chinese coolie will be coupled up with a donkey or an ox to furnish the motive power. In one of the accompanying

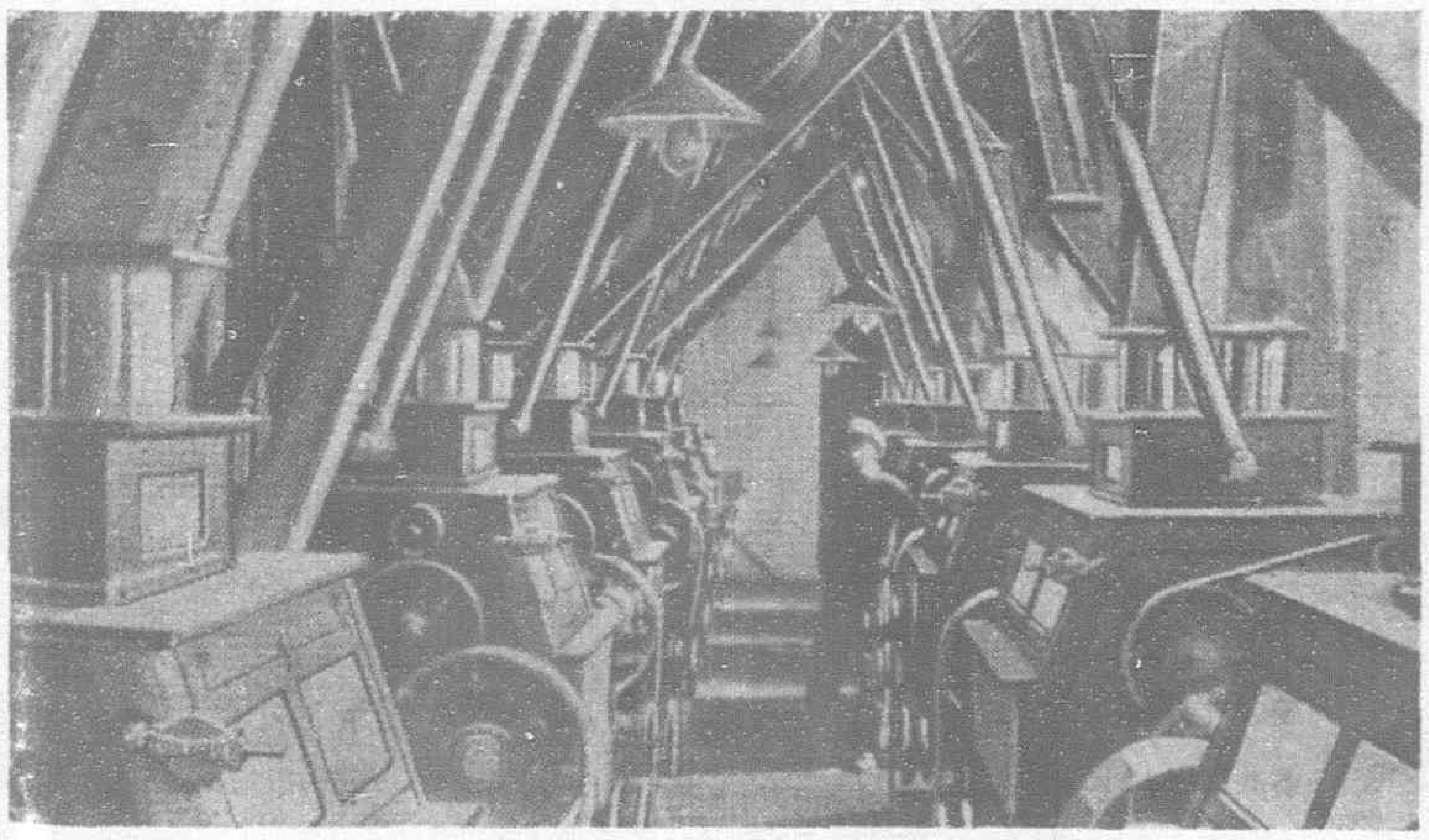
(Continued on page 79).



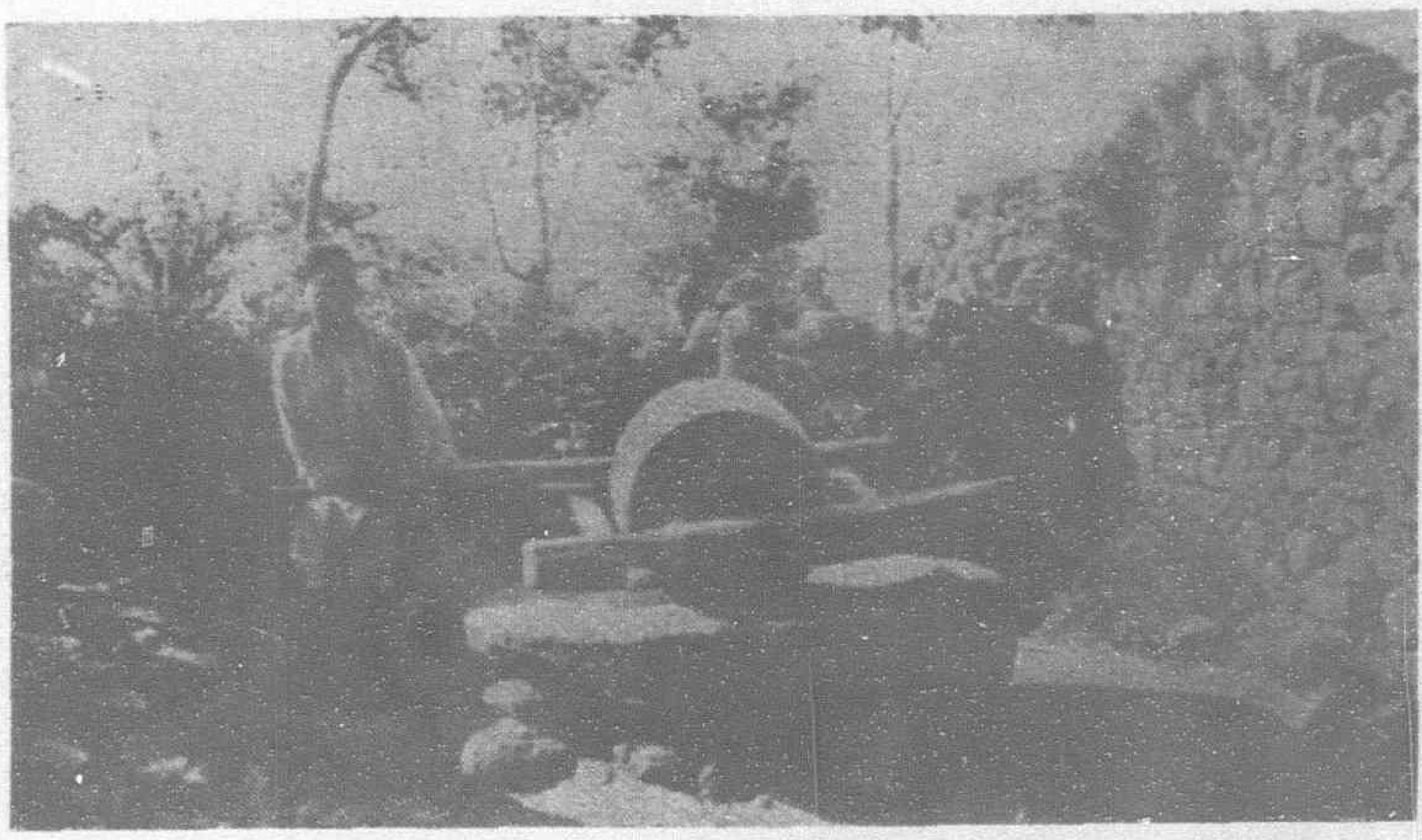
Grinding Floor



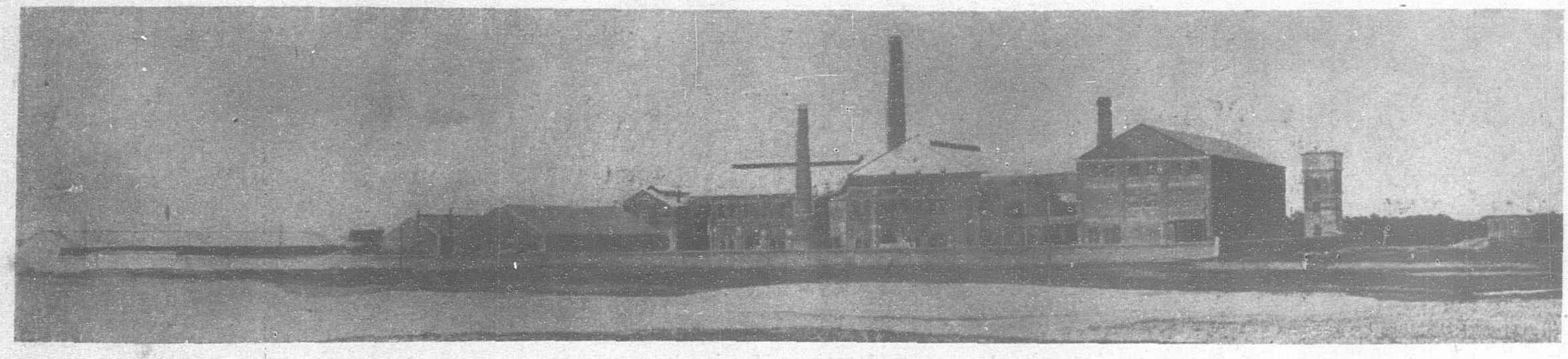
Bolters on the Top Floor



Another View of the Grinding Floor



A Native Mill



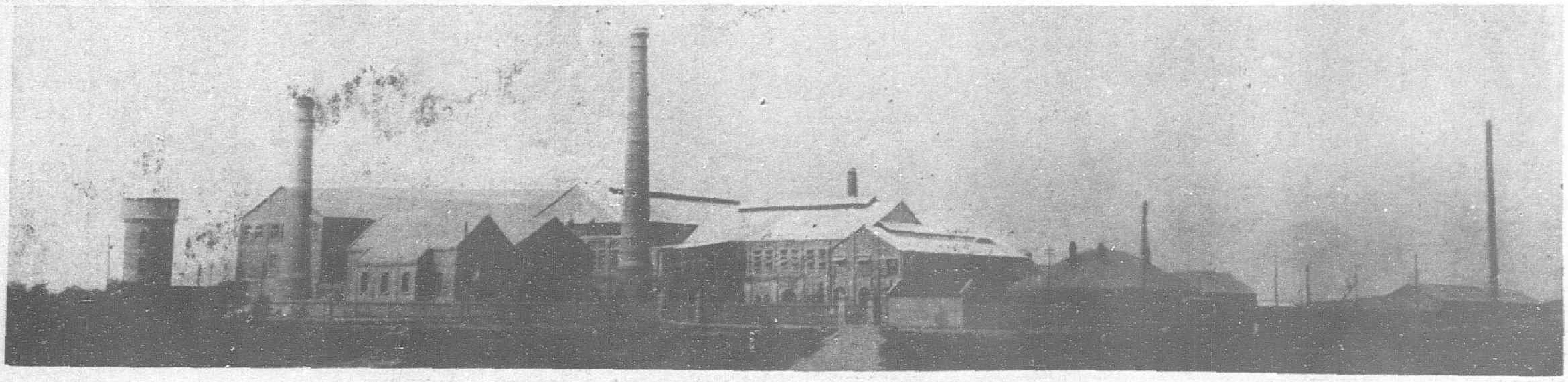
General View of the Yao Hua Mechanical Glass Works at Chinwangtao.

A Modern Glass Factory in China

The Plant of the Yao Hua Mechanical Glass Company, Chinwangtao

THE completion of the factory of the Yao Hua Mechanical Glass Co., Ltd., at Chinwangtao and the manufacture, on a commercial scale, of window glass by means of the Fourcault process marks the commencement of a new era in this industry in China.

The question of manufacturing glass in China by this process was first brought up during the year 1919 by the Chinwangtao Glass Co., which, in 1920, acquired from the holder of the Fourcault patents, all rights to exploit them in China, Hongkong and Macao. In the year 1921, the Yao Hua Mechanical Glass Co., Ltd., representing Sino-Belgian interests was formed and with the active co-operation and assistance of the Kailan Mining Administration, the erection of a factory was commenced.



General View of the Yao Hua Mechanical Glass Works, Showing Main Entrance.

Its construction was supervised by experts and the present imposing factory—of which we reproduce several illustrations—is the first and only one of its kind in China: and is one of, if not actually, the largest Fourcault factory in the world: the annual production being expected to reach 150,000 cases.

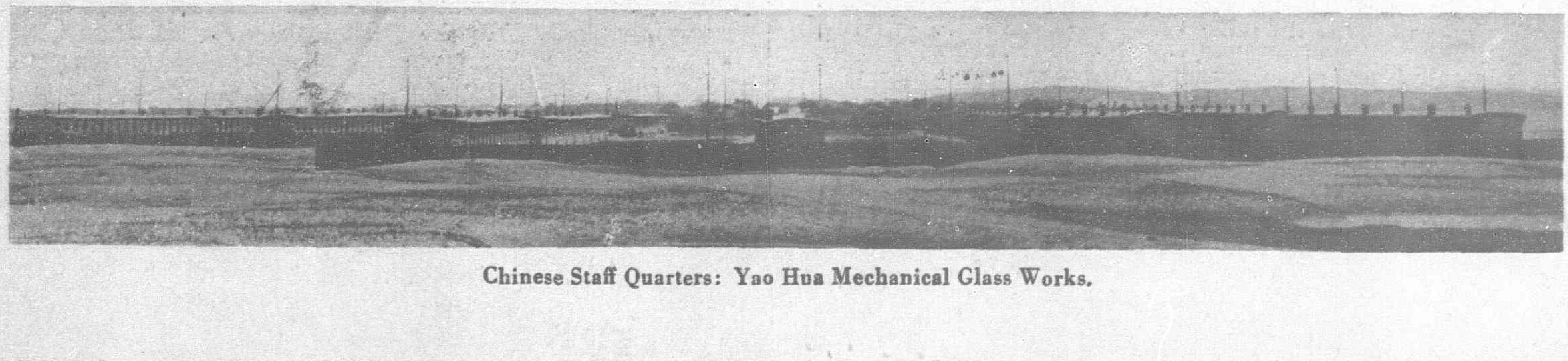
Apart entirely from its size, it is the most modern installation of its kind, being equipped with all the latest improvements and labor-saving devices perfected in connection with the Fourcault process. In fact, so anxious has the company been to keep abreast of the times that numerous details have been altered during the course of construction in order to ensure the introduction of the latest inventions.

The process embodied in the inventions of Fourcault is admitted to be the most up-to-date method of producing machine-made sheet glass. Glass produced by this process is very much superior to that manufactured by the complicated and indirect method of hand production and the Fourcault process produces an excellent quallity of sheet glass with a marked absence of the flaws, bubbles and strings so noticeable in hand-made glass, and an absolute regularity of thickness throughout.

A certain quantity of selected Yao Hua glass is made into mirror glass, by a special foreign process of silvering, and as the glass used for this purpose is absolutely flawless, Yao Hua mirrors are a much superior product to that heretofore sold in the Far Eastern markets.

Description of the Plant

The principal building of the factory contains the gasogenes, furnace and the drawing machines. At the extreme north of this building are located six "Morgan Gasogenes" which supply the gas for heating the furnace. Immediately next to the gasogenes is the "Fusion Tank," a vest refractory basin 28 metres long by 5.50 metres wide, whose contents approximate 500 tons of molten glass. A composition is placed in this tank in the form of a mixture of the various raw materials necessary for the manufacture of sheet glass, and is therein subjected to a temperature of over 1,400° centigrade; at which temperature the mixture melts and its component parts react chemically, the one with other, with the result that the mixture becomes an homogeneous body and becomes molten glass. At this temperature the glass is liquid and floats towards an opening in the furnace which leads out into a canal and thence to

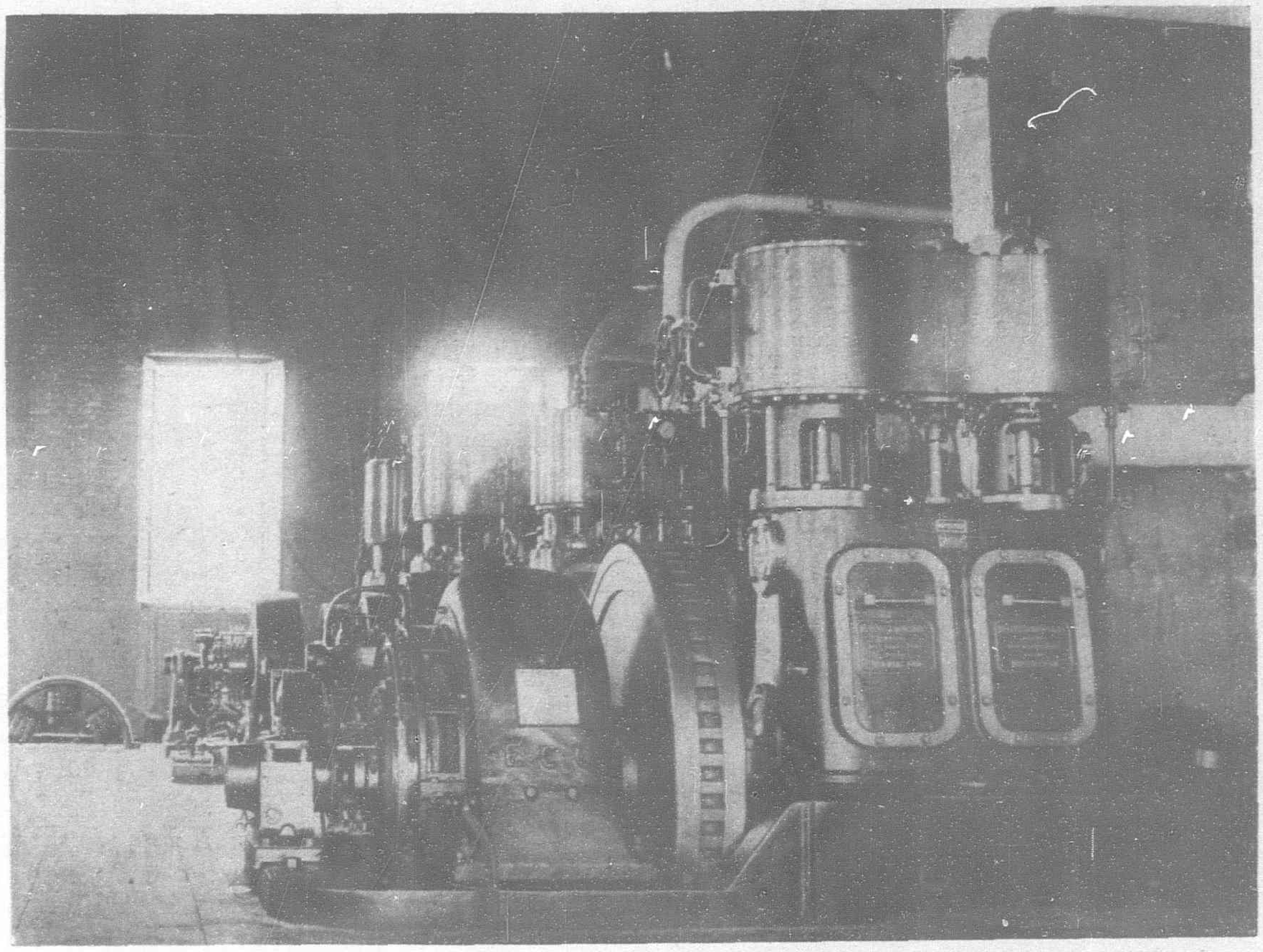


Chinese Staff Quarters: Yao Hua Mechanical Glass Works.

a "drawing basin," 30 metres long by 2 metres wide, above which stand eight drawing machines.

Below each machine the drawing basin is closed by refractory blocks, which form what is known as the "Well." Inside of the well a special refractory block known as the "Debiteuse" is placed in the liquid glass where it floats. Each debiteuse has running through its centre a long and narrow horizontal fissure and in drawing the glass the debiteuse is sunk into the well to a depth sufficient for the lips of the fissure to dip below the level of the molten glass; simultaneously an iron frame with a series of teeth at its lower end is let down to meet the gush of glass forced up through the debiteuse. The teeth of the frame cling to the glass and the frame is then drawn upwards, drawing in its train a continuous sheet of glass. Water jackets, placed on either side of the sheet, cool and solidify it, and it is then seized by a set of twin rollers covered with asbestos and guided by these rollers, which are tractors merely and not flatteners, is passed through a metallic box which serves as an annealing chamber. The sheet continues to be drawn upward, cooling all the time, and eventually arrives at the upper floor and from there is passed to the "Receiving Table" where, for the first time, it is touched by human hands.

Each drawing machine is worked separately by an electric motor and it is therefore possible to regulate exactly the revolving speed of the rollers, it being on this speed that the thickness of the glass depends.



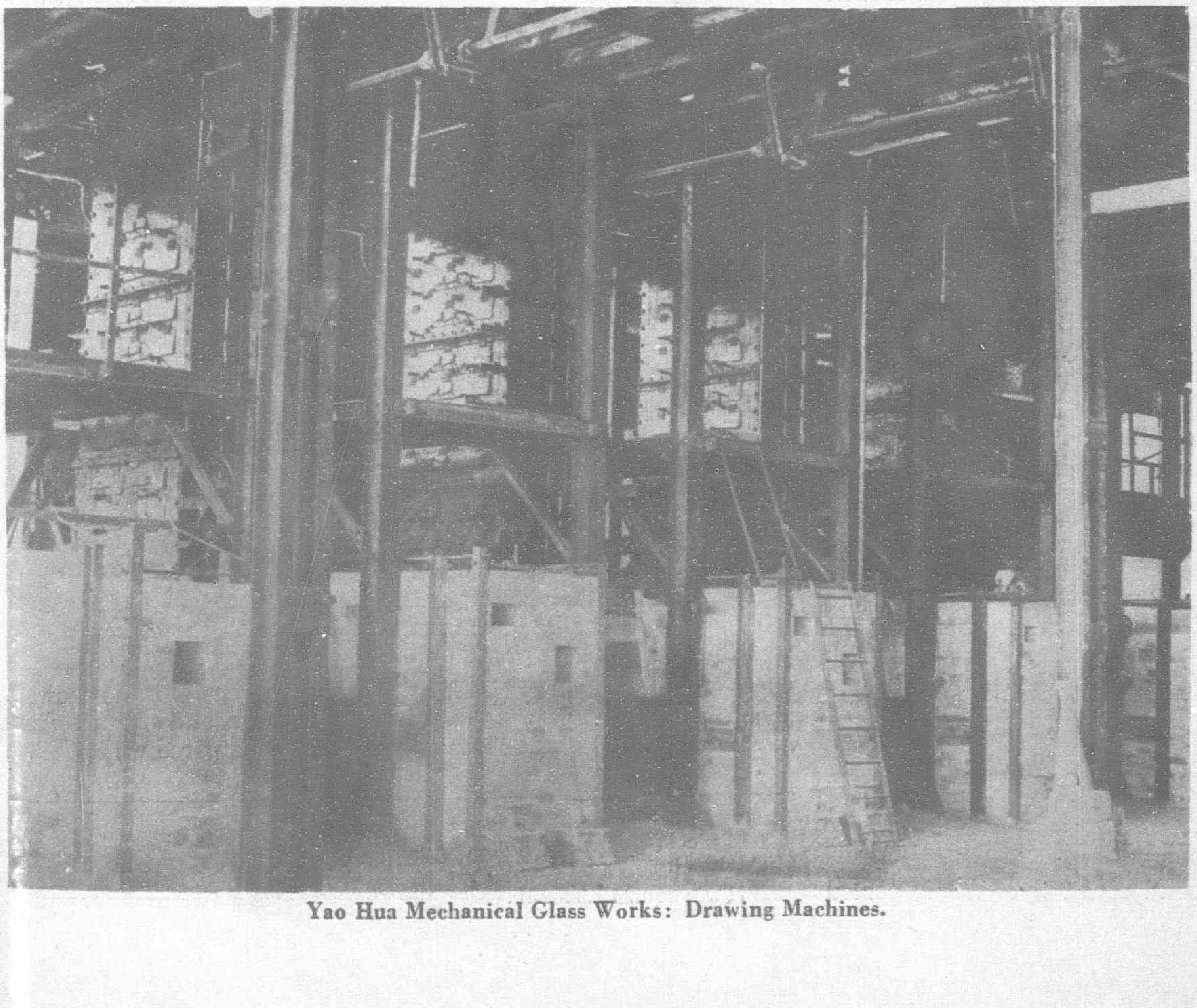
Interior of Power House.—Belliss and Morcom Engines and Electric Construction Company's Generators.

The glass has now arrived from the machines and is deposited on the receiving tables. At this point it has thoroughly hardened and is ready for cutting. The "Cutting Shop" is situated on the second story of a building built at right angles to the pincipal building, and it is here that the sheet glass is cut up into whatever sizes are desired. The cut glass is then packed into cases containing 100 sq. feet, and lowered by elevator to the ground floor, where the store-rooms are located. On the ground floor of this building the box-making plant is situated, and the "Pottery," where the special refractory pieces required by the factory are manufactured, is also in this building.

Apart from these principal buildings, there is in addition a waterworks supplying 150,000 gallons of water per 24 hours, an electric power station with three Babcock boilers and two Galloway boilers, a composition room where the raw materials are mixed, a general stores, and the administrative offices.

Mention must also be made of the living quarters of the foreign personnel which consists of 19 bungalows erected on property adjacent to the works compound. The company has also erected 120 houses for the use of their Chinese staff.

The head office of the company is situated at Tientsin, where also the general management is in the hands of the Kailan Mining Administration. The administration has also undertaken the sale and distribution of the products of the Yao Hua Glass Company throughout China and the Far East.



Yao Hua Mechanical Glass Works: Drawing Machines.

The Chemical Trade of the Far East

German Synthetic Ammonium Sulphate in Japan

THE amount of sulphate of ammonia imported into Japan during 1923 reached the high total of 2,428,840 piculs[*] valued at Y.24,947,000 as compared with 1,550,376 piculs, valued at Y.12,742,145 in the previous year. This commodity, and artificial fertilisers in general, enjoy a growing popularity in Japan, but there has been much erratic purchasing of sulphate of ammonia both during 1923 and in the first part of 1924, the total value of the imports up to the end of May being Y.17,912,000. German synthetic sulphate of ammonia, which began to arrive towards the end of 1923, has a high reputation among the Japanese on account of its whiteness and excellent quality, and the German share of the import business in this line is steadily growing. The following official figures indicate the main sources of supplies in the past two years. It will be seen that Great Britain's share increased enormously during 1923.

	1923		1922	
	Quantity (piculs).	Value (yen).	Quantity (piculs).	Value (yen).
Great Britain ..	760,325	7,804,452	36,114	307,164
United States ..	1,440,892	14,631,750	1,394,964	11,433,913
Other countries ..	227,623	2,514,407	119,298	1,001,068

Japan herself produces about 100,000 tons of sulphate of ammonia per annum, from 5 to 10 per cent. of which is roughly the output of the gas works. The amount of nitrate of soda imported during 1923 was 1,116,888 piculs, valued at Y.8,196,171—a material increase over the corresponding figures for 1922 which were 881,106 piculs, valued at Y.6,540,094.

Although such official statistics as are available show a decrease in the value of the imports during 1923 of the two most important heavy chemicals, caustic soda and soda ash, which are taken together in the special post-earthquake returns, there was no marked change in the quantity bought, the difference being accounted for by a substantial decrease in the price. There has been a further reduction during the first half of the present year.

The business in soda ash is now practically monopolised by Great Britain. The Asahi Glass Company produces a small quantity for consumption in its own factories. In the case of caustic soda the annual import is roughly 15,000 tons, of which two-thirds come from the United Kingdom and the remainder from the United States. There is also a domestic production of some 5-6,000 tons per month, about 80 per cent. of which is made by the Dai Nippon Jinzo Kaisha (Artificial Fertiliser Company), the remainder being the combined share of the smaller factories.

The United States and the Japanese Cyanide Trade

The United States have recently captured a part of the import trade in cyanide of potash and soda, which are used in gold mining, and the whole supply of which formerly came from the United Kingdom. German manufacturers are making a serious effort, by cutting prices, to get into this market for such chemicals as muriate of ammonia, carbonate of ammonia, bichromate of potash, etc. In view of the destruction of stocks in the earthquake, importers took advantage of the remission of the import duties to make large and somewhat speculative purchases of drugs and fine chemicals, and new import business was accordingly at a standstill by the end of April of this year. During 1923 German drugs were cheap, but by the spring of 1924 there was little difference between German and British prices. The quality of German drugs is considered to have depreciated in the past twelve months.

The Dyestuffs Trade Position

Germany now supplies 85 per cent. of the dyestuffs imported into Japan. The speculative buying which followed the Ruhr occupation was followed by depression in the summer of 1923, and despite the loss of large stocks in the earthquake there was inactivity at the end of the year and in the spring of 1924. The total amount of coal tar dyes imported during 1923 was eight million *kin*[†] as against 7 million in 1922; the value, however, decreased from Y.13,652,024 to about 9,986,000. Germany's share was 6,874,766 *kin*, and that of Switzerland, which specialises in the increasingly popular chrome colors, rose from 116,814 *kin* in 1922 to 484,938 in 1923.

Early in June, 1924, the Japanese government yielded to the pressure which has been exerted for some time by the Japanese dye manufacturers for additional protection against cheap and popular imported dyes to the extent of issuing an ordinance so worded as to make an import licence necessary in the case of dyes imported from all countries, except where such restrictions conflict with a treaty of commerce—*i.e.*, in the case of Great Britain, France, and Italy.

Depression in Japanese Match Trade

The match industry is another Japanese export business which, once flourishing, is now in difficulties. Exports fell from 15½ million yen in 1922 to 10½ million yen in 1923, and the match manufacturers are finding it hard to compete in India and in China with European goods, and with the goods now manufactured in those countries. Attempts have been made by Japanese to start match factories in India in co-operation with Indian capitalists and similarly a proposal to start match factories in China has recently been mooted—the idea being to take advantage of cheap labor and low overhead costs there, as has already been done by Japanese cotton mill owners in Shanghai and elsewhere. This depression in the Japanese match industry has had the effect of reducing imports from the United Kingdom into Japan of potassium chlorate.

Chemical Trade of Formosa

Mr. G. M. Phipps (H. M. Consul, Tamsui), in an appendix on Formosa, states that the demand for chemical fertilisers has undergone considerable development in recent years, the import in 1923 reaching 74,112,902 *kin*, valued at Y.5,287,074. Of this, five-sixths was supplied from (or through) Japan. The principal chemical fertiliser is sulphate of ammonia, and of this all of the direct import from abroad in the year 1922, was of American origin. In 1923 over one-half was British and one-third American, while for the first three months of 1924 the entire import was British. The fertiliser chiefly used, however, is bean-cake, imported wholly from China, to the value in 1923 of over 5 million yen. Camphor in Formosa had a somewhat unsatisfactory year owing to the reduction in exports to most foreign countries, notably the United States, while those to Japan and also France showed a slight increase. The total exports amounted to some 428 million lbs., of which over one-third went to Japan, just under one-third to the United States, one-sixth to France, and the remainder mainly to the United Kingdom. The first three months of 1924 showed a further big drop to all foreign countries except France, while Japan's share underwent an increase. Exports of alcohol rose by one-third to over 1½ million gallons. The first three months of 1924 showed a heavy falling off in exports as compared with the corresponding period of 1923.

The following statistics are taken from a general table showing the value (in Y.1,000) of certain imports into and exports from Japan during 1923, and January/May, 1924, compared with 1922.

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[*] 1 picul (100 *kin*) equals 132.27-lb. 1 *yen* (100 *sen*) equals about 1s. 11d. (July, 1924).

[†] 1 *kin* equals 1,3237-lb.

Exports From Japan (Value in Y.1,000).

Jan./May,	1924	1923	1922
Starches	91	201	1,436
Vegetable Oils	2,475	2,633	4,113
Camphor	2,934	8,879	7,248
Menthol	4,181	3,452	3,323
Soaps	1,735	2,871	2,341
Cement	882	2,010	3,907

Imports Into Japan (Value in Y.1,000).

Salt	735	2,612	7,322
Chile Nitrate	3,381	8,195	6,535
Ammonium Sulphate	17,912	24,947	12,737
Phosphate Rock	4,456	4,855	8,984
Caustic Soda and Soda Ash	2,365	7,584	8,978
Coal-tar Dyes	3,973	9,986	13,649

Germany and the Chinese Dyestuffs Market

In his report on China, Mr. H. J. Brett states that during the second half of 1923 shipments of synthetic indigo from Germany practically ceased owing to the restrictions imposed by the army of occupation on the Rhine, and imports from other countries increased to a corresponding extent. Towards the end of the year, however, shipments from Germany were resumed, and with her re-entry into the market prices have fallen rapidly to their former level. The indigo situation in China is one of considerable difficulty to all the manufacturers concerned owing to the fact that the world's capacity for output is greatly in excess of the demand, and we find therefore an overstocked market, a general low price level, and little if any profit for the manufacturer, the importer or the dealer. Imports of American indigo have increased very considerably during the past twelve months ; Swiss shipments were normal, and French indigo has also reappeared in the China market. After an absence of two years, shipments of British indigo again appear in the returns for 1923, but the quantity is small in comparison with those from Germany, the United States and Switzerland.

In other coal-tar dyestuffs the German hold on the Chinese market is still stronger than in the case of indigo, this trade being a good instance of the value still attaching in China to old-established " chops " or brands. In such trade as is not dependent on " chops," amounting possibly to one-fifth of the whole, British and American dyes are better represented. Owing, however, to the disturbed situation throughout many parts of China, the high price of cotton goods and other adverse conditions, the demand for dyes during the period under review has been far from satisfactory.

On the export side, the Chinese wood oil trade is of growing importance, the demand in the United States and other countries, where it is used extensively in the manufacture of varnishes and for other industrial purposes, showing a marked increase. The demand for camphor was inactive during 1924 and it would appear that the genuine article from China is to a great extent being supplanted by synthetic camphor.

In conclusion the following Chinese overseas trade statistics selected from a comprehensive table compiled by Mr. Brett should be of interest. Among the principal articles of Chinese products exported from China, antimony regulus fell in quantity from 201,031 piculs in 1922 to 48,406 piculs in 1923. Exports of bean cake, however, rose from 21,590,000 to 24,785,000 piculs in the same period. With regard to oils, the total exports (vegetable and essential) rose from 2,669,596 piculs in 1922 to 3,515,000 piculs in 1923. On the import side, the quantity of cement shipped into China rose from 19,156,192 piculs in 1922 to 22,434,962 piculs in 1923. Imports of soap and soap-making materials which represented a value of 2,563,000 Haikwan Taels in 1922, represented a value of 2,323,000 Haikwan Taels in 1923.

British Trade Report

Large Contract for Irak

The development of cotton production in Irak has resulted in important cotton-growing concessions having recently been secured by a large British syndicate, and as a result a contract worth £500,000 is shortly to be offered to a selected number of engineering firms. This is to provide the first section of the huge irrigation works which will be necessary. The complete scheme, which is estimated to cost upwards of £17,000,000, will include a barrage of the Euphrates, the formation of large storage reservoirs, and the construction of a vast system of canals.

Advance in Flour Milling in China

(Continued from page 75.)

illustrations we show a four-man team which was used for harrowing and seeding. This is a very common scene throughout the agricultural districts of the country and the continued use of this method lies in the fact that unemployed coolies are so numerous that any number of them can be secured for a mere pittance in wages.

The threshing of wheat is accomplished by the use of a stone roller about two feet in diameter and about two and one-half feet long. This device is usually hitched to a donkey and the wheat is scattered over what is called a threshing floor. The donkey runs around in a continuous circle and the stone roller crushes the wheat berries from the heads. After this the straw is thrown high into the air where the wind carries away the chaff. The wheat is then placed in bags, and if the farmer delivers his wheat direct to the mill, he usually piles a number of bags on donkeys and leads them to the mill ; or if it is to be delivered to the wheat market, it is piled on large wheel-barrows which are pushed by coolies.

Practically all of the coal and most of the wheat is delivered to the Chen Foong Flour Mills by coolies with the aid of wheel-barrows and practically all of the flour and bran is hauled away from the mill in the same manner. As idea of the brawn and ability of these fellows to stand up under severe labor conditions will be had from the fact that a very common load taken away from the mill by one coolie consists of about 20 50-pound bags which are often carried as far as five miles or more. Another common method is to load a large truck with bags of flour and have a number of coolies for both pushing and pulling the loaded truck to the market. The trucks carry a load as heavy as some of our large motor trucks can haul, but still nine or ten coolies can move it at a fairly good rate of speed and, considering the condition of most of the country roads throughout China, the coolies probably make better time and deliver the goods with less expense than could be done with motor trucks. The country roads are hardly more than deep ruts worn down by continuous travel through the centuries and would be impassable for many of the modern motor trucks.

These conditions not only apply to the handling of wheat and mill products, but they also apply to practically every commodity that is transported.

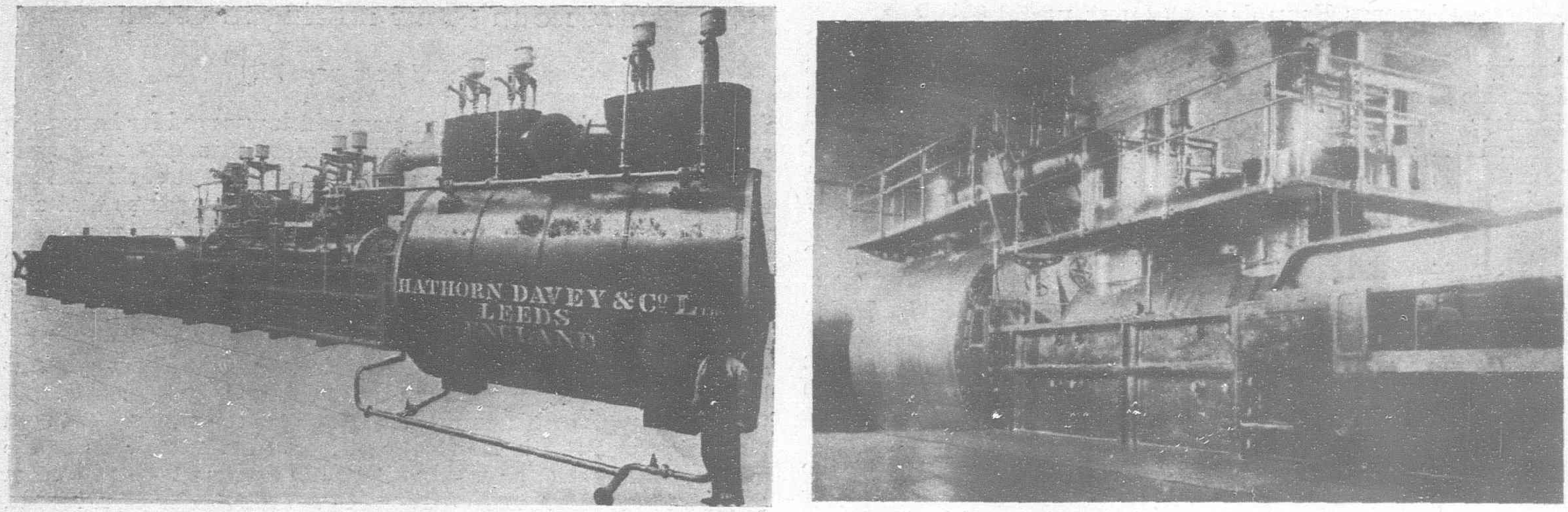
Singapore Dock Project

Cost of Improvements

The estimate for dockyard improvements at Singapore is made up of the following items, states a naval correspondent of a home paper :—

1. Works common to all departments, viz., wharfs, basins, railways, roads, dredging berth for floating dock, etc.	£5,100,000
2. Graving dock	1,000,000
3. Offices, dwellings, and other buildings	420,000
4. Workshops, storehouses, magazines	1,780,000
5. Contingencies	1,200,000
6. Machinery	1,000,000
	£10,500,000

While most naval men favor the establishment of a large fixed base at Singapore, service opinion is not entirely unanimous on this question. In a paper read before the institution of naval architects last June, jointly written by Captain D. J. Munro, R.N., and a civilian member, an alternative plan was mooted. The authors' idea was that a great deal of money could be saved and equally good results obtained if a floating base were substituted for the permanent works favored by the admiralty. They estimated the cost of a floating base to be £1,400,000, expended as follows : Large floating dock, £500,000 ; small floating dock, £50,000 ; floating crane, £200,000 ; floating workshop, £500,000 ; mooring lighter, £50,000 ; launches, etc., £100,000 ; total £1,400,000.



Hathorn, Davy Pumping Engine at the Pekin Syndicate Mines in Honan, 170,000 gallons per hour, 700-ft. head

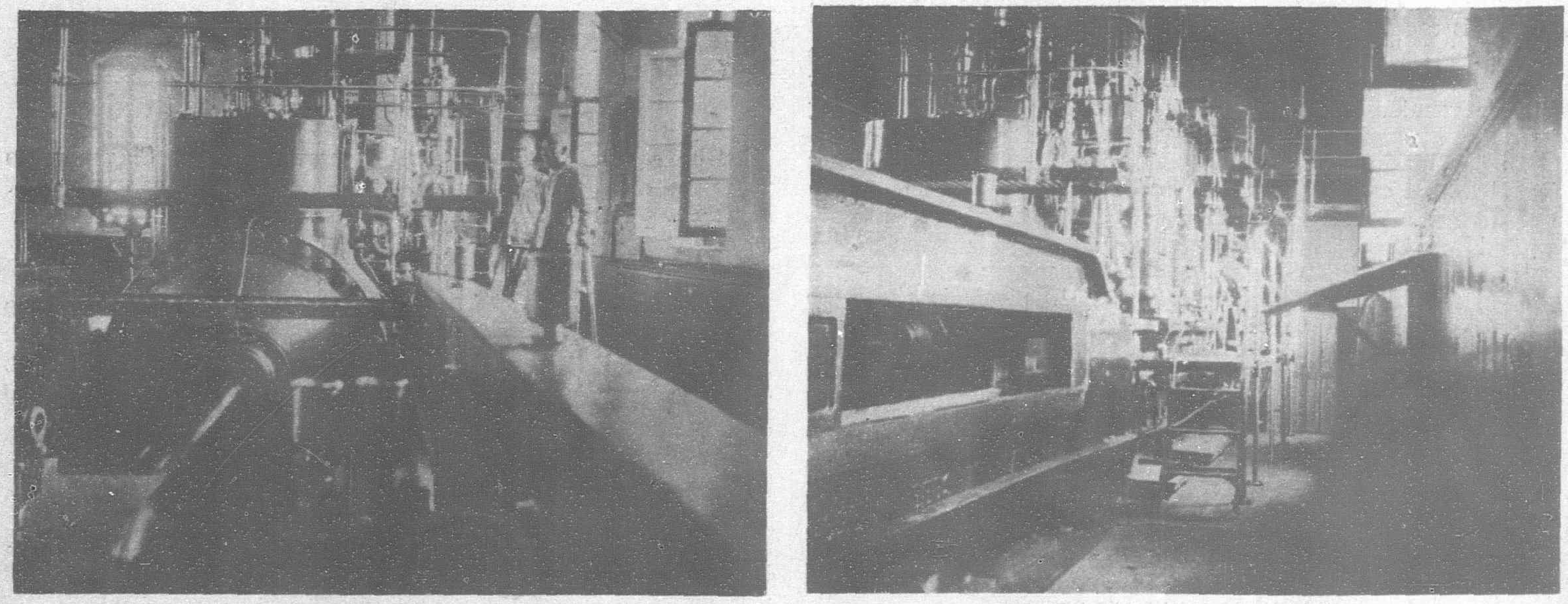
British Pumping Engines for Peking Syndicate Mines

THE Peking syndicate collieries have purchased an additional pumping plant from Messrs. Hathorn, Davey & Company for use in their mines in China.

Over 20 years ago the Chinese Engineering and Mining Company ordered a large pumping plant for their collieries from Messrs. Hathorn, Davey & Co,. Leeds. Other mines, not far from Tientsin, followed suit, and when the Peking syndicate began opening up its coal property, in 1910, it was found that plant must be provided to deal with large quantities of water. After careful consideration by the engineers, it was decided to instal a compound, overground, condensing pumping engine of the largest size, capable of raising 174,000 gallons per hour from a depth of 600-ft. with steam at a presure of 100-lbs. to 120-lbs. per square inch.

The pumping plant consists of one horizontal compound, tandem, surface condensing pumping engine controlled by Davey's patent differential gear. The engine is on the surface and operates two pump rams 26-in. diameter, by means of quadrants. The engine cylinders are 56-in. and 110-in. diameter, and both the engine and the pumps are of 10-ft. stroke.

The plant was complete with surface condenser and double-acting ram type air pump, and an oil separator was fitted to the exhaust steam range so that the air pump discharge could be used for boiler feeding. The plant included the rising main and the necessary spear rods from the main caps to the pump ram heads, and the total weight of machinery supplied was approximately 685 tons.



Other Views of the Hathorn, Davy Pumping Engine Installed in the Pekin Syndicate Collieries

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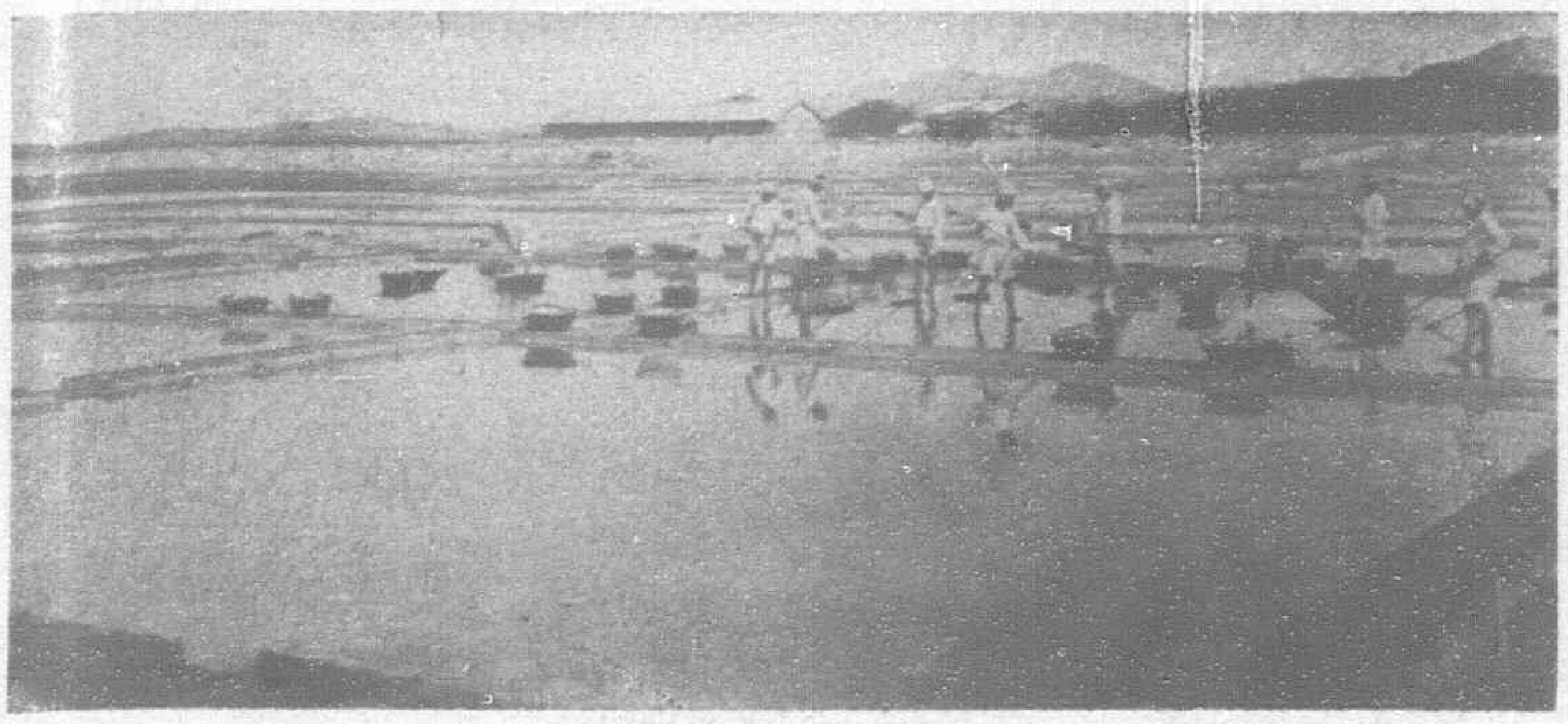
Sternbush Boring Machine for China

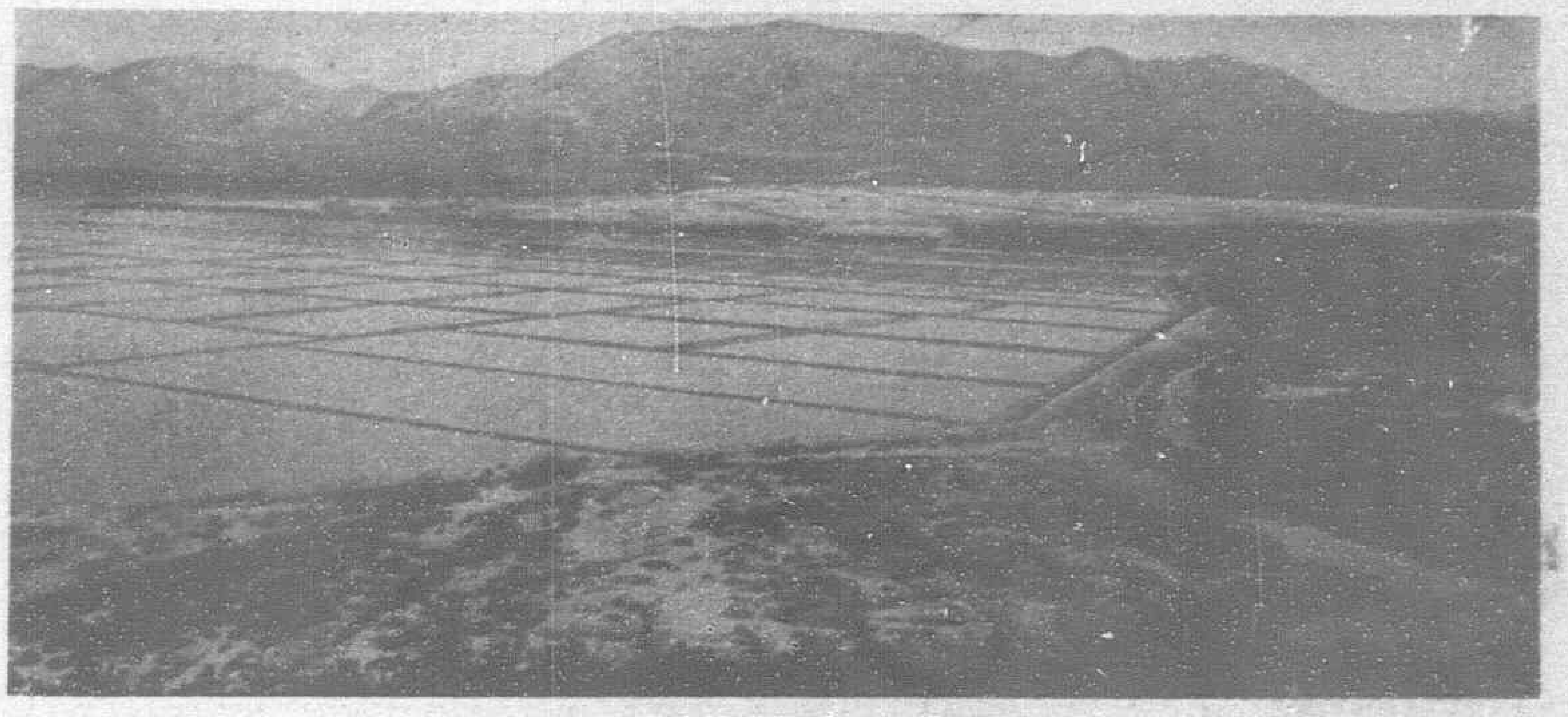
A contract for a Sternbush boring machine for use in China has just been placed with Messrs. John W. Barnes, Ltd., of Rock Ferry, Cheshire. A similar machine has just been completed for one of the large British shipbuilding yards.

Two New Motor Ships for Siam

Announcement has just been made that Siam will require two twin-screw motor ships of about 3,000 tons register each. Tenders for these are required by the ministry of commerce by June 30 next.

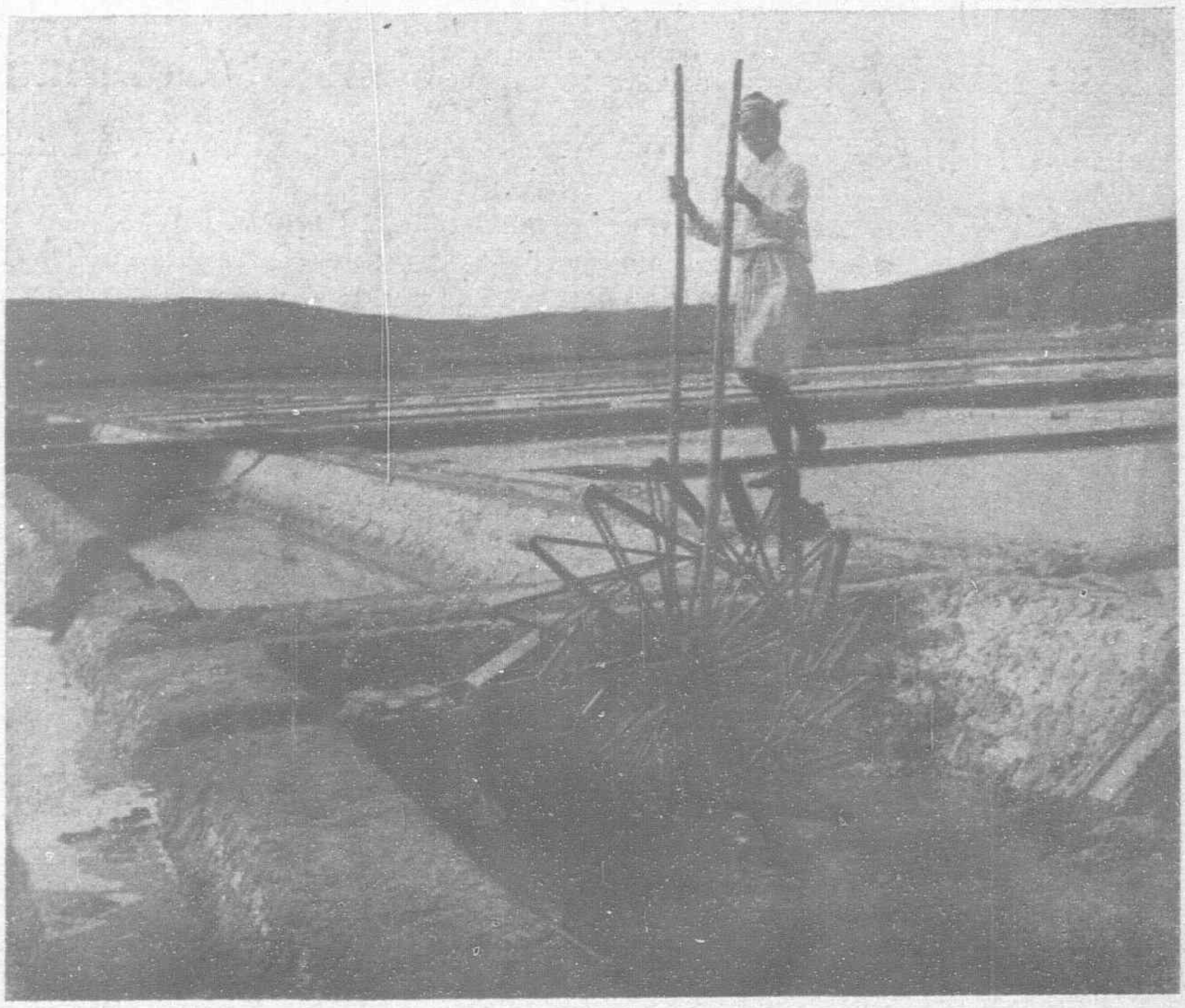


Gathering the Salt



A Salt Field at Shuan

The Salt Industry of Korea



Bringing up the Brine

FOR centuries, the Koreans found manufactured salt along their coast by the primitive method of parching. This method requires a large amount of fuel and labor and results in a high cost of production for the commodity. Chinese salt, which is produced by evaporation, was introduced into Korea at the beginning of the present century and was able to undersell the native product. The result was that the amount of salt imported constantly increased, while the native industry retrograded. In 1907, the Chosen government made investigations into the conditions of the salt industry in Ryuko, Keisho-nando, at the same time experimenting in the production of salt by the process of natural evaporation at Shuan, Keikido. The results showed that by this process, a better and cheaper salt could be produced. The new method was therefore adopted and widely introduced. Between 1917 and 1919, salt installations, using the new method, were erected as follows :

Koryowan, Heian-do	774	square *cho**	(1912—1914)	completed
Shuan, Keikido ..	88	,, ,,	(1907—1911	,,
Tokudo, Heian-do ..	223	,, ,,	(1919—1920)	,,
Shuan, Keikido ..	124	,, ,,	(In 1919)	,,
Total	1,209	,, ,,		

It is expected that when these fields reach their maximum maturity, more than 100,000,000 *kin* of salt will be produced. The present output of parched salt is about 70,000,000 *kin*. The total of 170,000,000 *kin* of salt produced by both methods will, however, be insufficient to meet the estimated consumption of salt which is about 400,000,000 *kin*. The government has. therefore, decided to extend the salt fields an additional 2,600 square *cho*, the development being spread over a period of nine years beginning with 1920. The locations of the new fields are as follows :

Nando, Keikido, 300 square *cho* (1920—1922) completed
Kijo, Heian-do, 149 square *cho* (In 1921)
Nanshi, Heian-hokudo, 217 square *cho* (1922—1924) completed
Kunshi, Keikido, 575 square *cho* (works started in 1921)

Each field, the year following construction, is capable of producing approximately 10,000 *kin* of salt per square *cho*. At maturity, the fields are capable of producing about 90,000 *kin* per square *cho*.

THE SALT MANUFACTURE AND IMPORT OF KOREA.

		1921-22	1910-11
		Acre	*Acre*
Area of Salt Pans	Shuan	1,060.85	78.40
	Koryowan	2,834.65	139.65
	Total	3,895.50	218.05
		Kin	*Kin*
Amount of Salt Manufactured	Shuan ..	10,682,846	737,580
	Koryowan ..	82,138.000	258,043
	Total ..	93,120,346	995,623
		Kin	*Kin*
Amount Imported	Japan Proper	26,794	5,289,418
	Formosa	—	4,680,000
	Kwanto-Shu	17,905,611	—
	China	168,182,417	83,324,783
	Others	—	547
	Total	186,116,822	93,294,748

Gathering Salt by Primitive Methods in Korea

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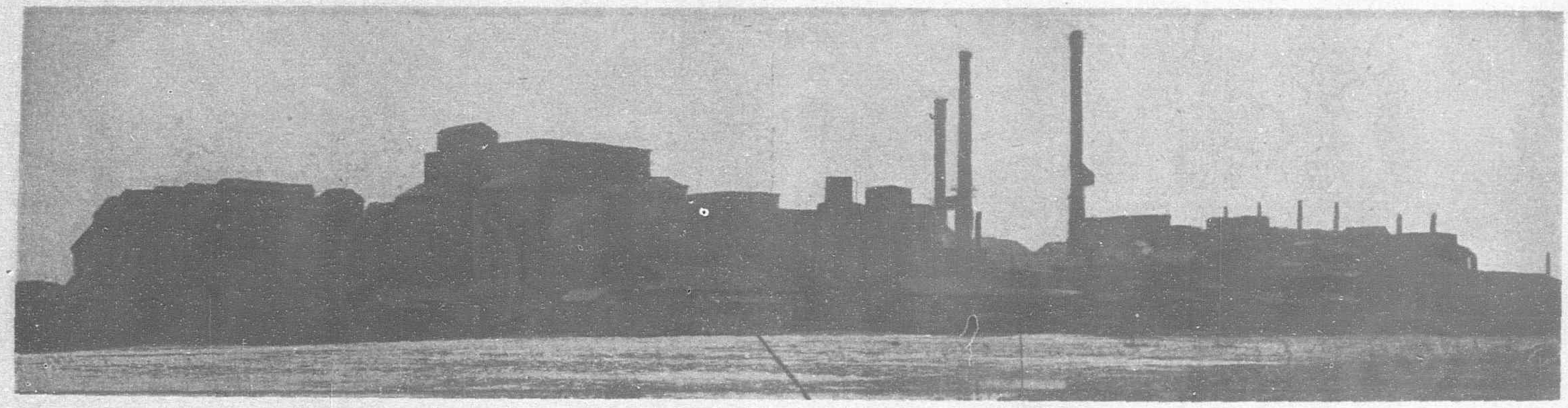
*Approximately 2½ acres.



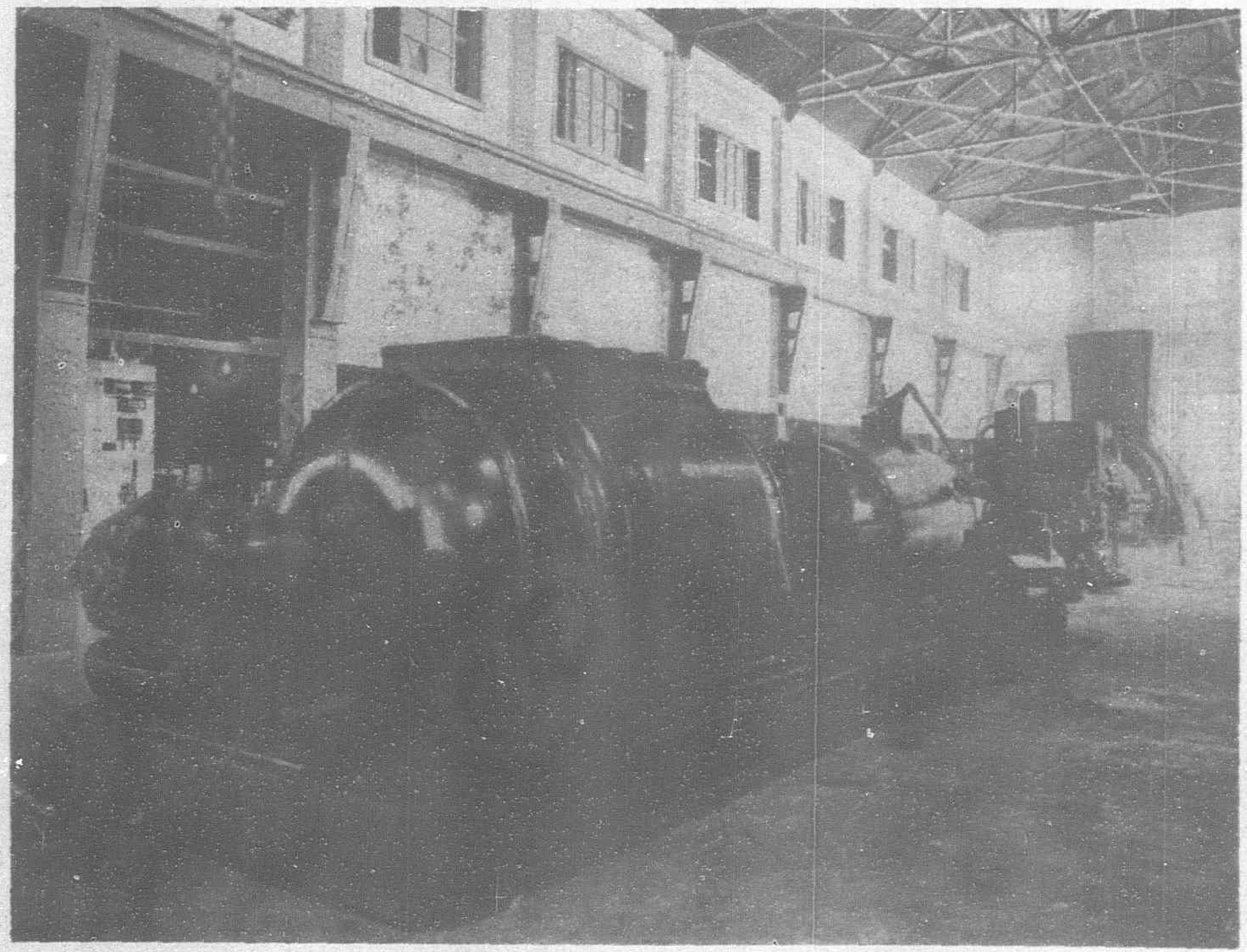
General View of the Kawasaki Plant of the Asano Cement Company.

A Modern Japanese Cement Plant

The Kawasaki Works of the Asano Cement Company, Ltd.

The Japanese Cement Industry

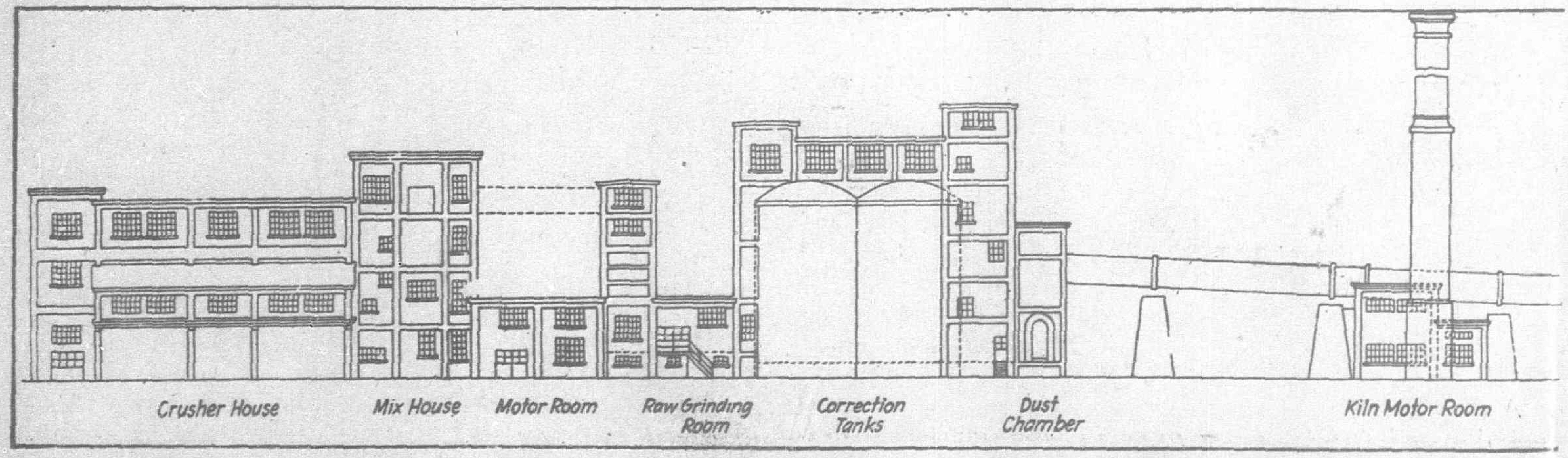
COMMENTING on the growth of the cement industry in Japan, Mr. Ryozo Asano, who has succeeded his father in the active management of the Asano enterprises in Japan, says that the first cement factory in Japan was built at Fukagawa, Tokyo, in 1871 as a government undertaking but for several years was operated at a loss. It was about to be discontinued when Mr. Soichiro Asano, whose name is familiar as the organizer of the Toyo Kisen Kaisha, stepped forward and took it over with the determination to make the industry a success. The factory at that time had a daily output of only a few hundred barrels sold mostly to the government. The growth of the industry was slow, but by 1908 production had reached 1,750,000 barrels. By 1914 there were 12 companies manufacturing cement in Japan, with total capital of Y.32,000,000, which produced some 3,625,000 barrels yearly. By 1919 the production had reached 6,500,000 barrels, produced by 20 companies, capitalized at Y.44,500,000 and employing some 7,000 laborers, about one-tenth of whom were female. Most of the output is produced by the dry process.



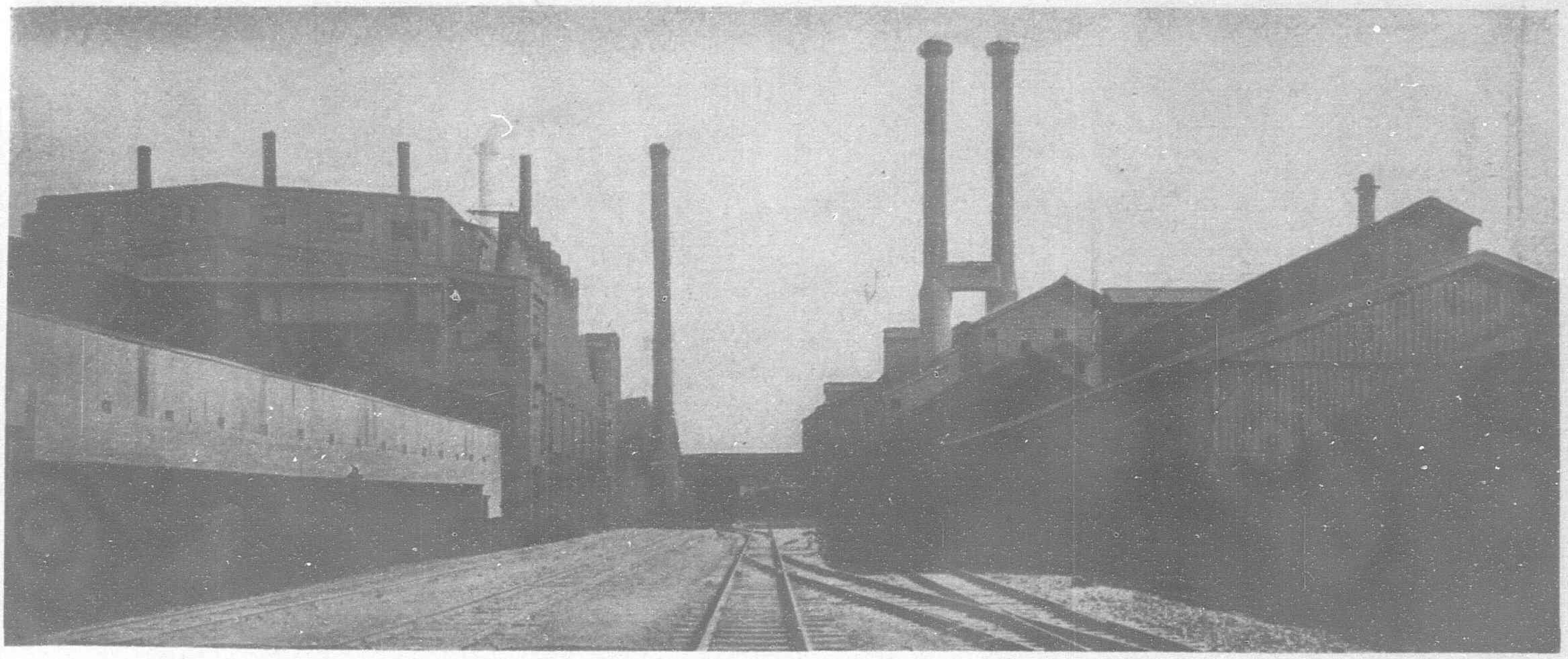
Power House of the Kawasaki Plant of the Asano Cement Company: Allis-Chalmers Turbo-Generating Sets.

During the war the cement industry, like all other industries in Japan, grew rapidly, benefiting by the markets which were opened to it through the inability of the European countries to supply the usual amount. Moreover, large quantities were being used in Japan itself in new hydraulic installations and in the construction of modern plants for the manufacture of war materials.

The exportation of cement from Japan began in 1913, when 149,000 barrels were shipped abroad. By 1916 the exports had increased to 667,000 barrels and in 1919 to 997,000 barrels. The production of cement in Japan from 1920



General Elevation of all Buildings in Plant



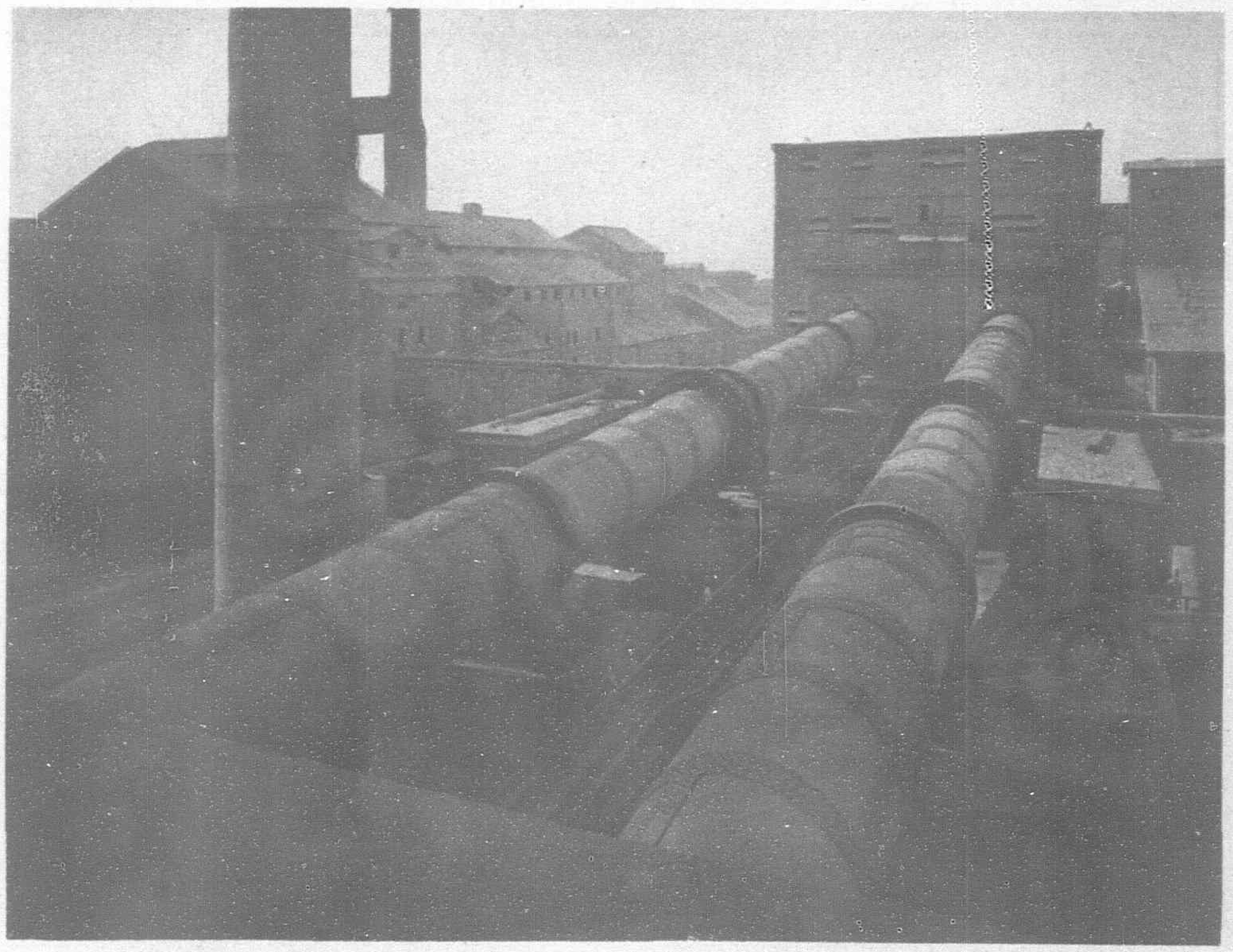
Kawasaki Plant of the Asano Cement Company: View from Train Yard.

to 1923 is shown in the following statement:

	Barrels
1920 ..	9,300,000
1921 ..	10,000,000
1922 ..	11,200,000
1923 estim.	11,800,000

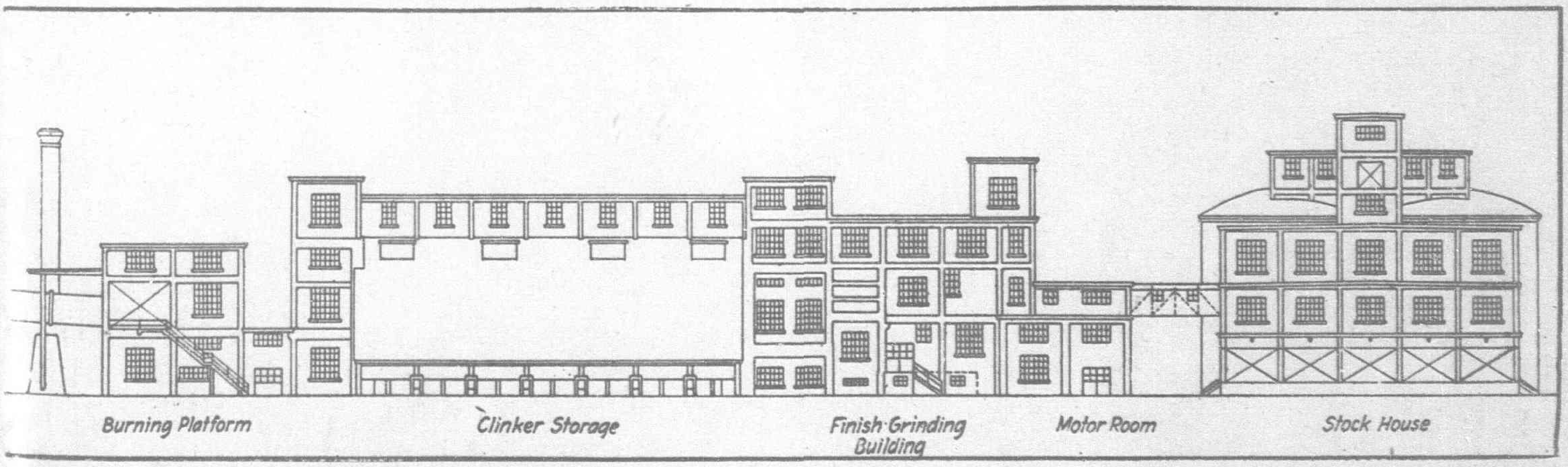
Prior to the earthquake there was a cement manufacturing capacity of about 14,000,000 barrels, computed on the basis that the plants were running full time without loss of the efficiency in machinery, labor, etc., but it is doubtful if this capacity would have ever been reached even if the earthquake had not occurred.

The principal concerns manufacturing cement in Japan are the Asano Cement Manufacturing Co., founded in 1912, capital Y.9,130,000 paid up, with plants at Tokyo and Moji; the Onoda Cement Manufacturing Co., founded in 1881, capital Y. 1,600,000 paid up, with plants at Yamaguchi and Dairen; the Sakura Portland Cement Co., founded 1907, capital Y.504,000, with plant at Osaka; the Toa Cement Manufacturing Co., founded by amalgamation of lesser companies in 1918, capital Y.4,000,000, with plant at Miye-ken; and the Aichi Cement Manufacturing Co., founded in 1889, capital Y.1,600,000 paid up, with plant at Nagoya.

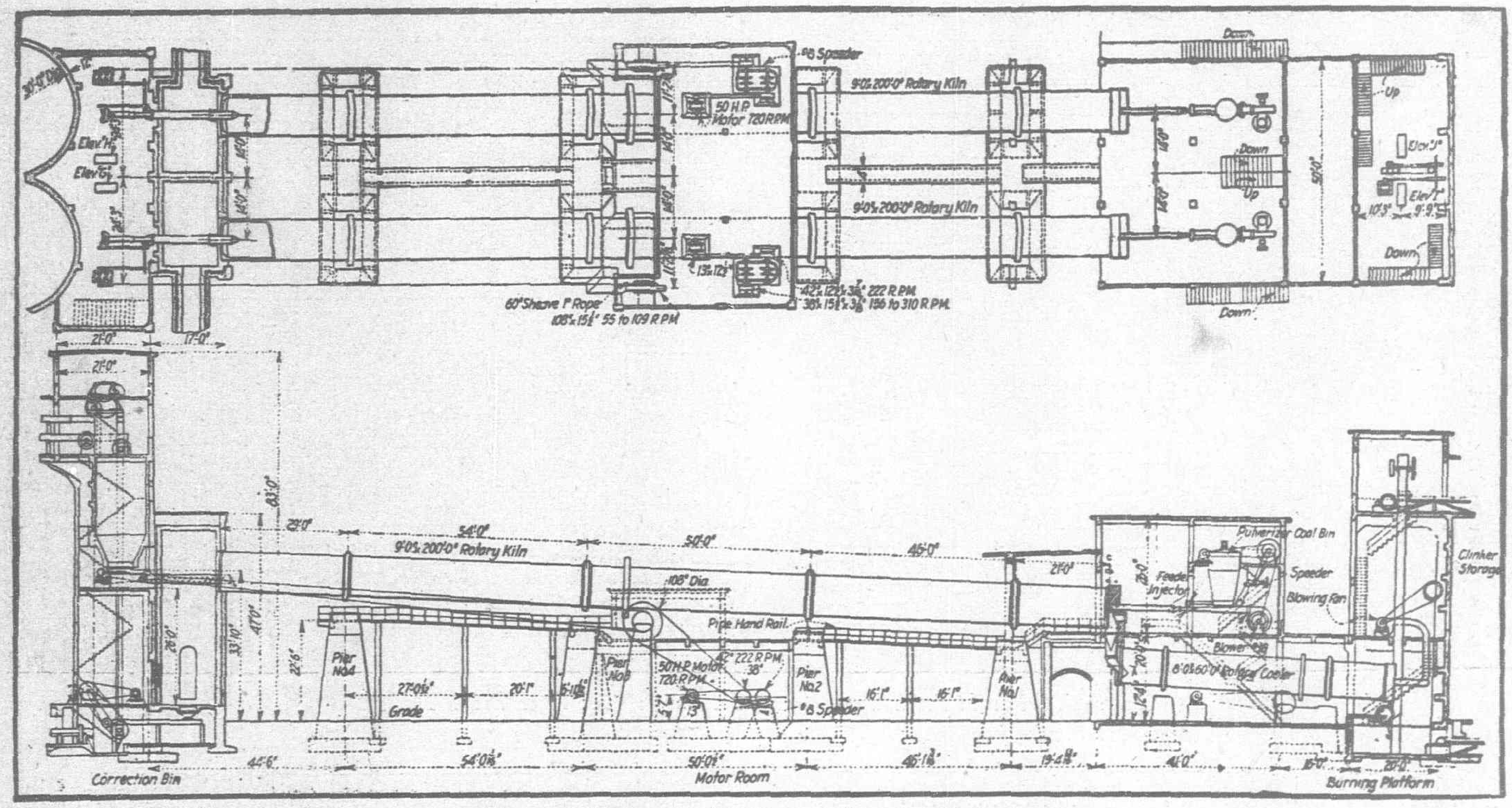


Allis-Chalmers Rotary Kilns at the Kawasaki Plant of the Asano Cement Company.

Of the total production of cement from 85 to 90 per cent. is consumed in



No. 2 of the Asano Cement Company at Kawasaki.



Plan and Elevation of Kilns and Burning Platform

Japan, the balance being exported principally to the Philippine Islands, Java, British India and other parts of the Orient. The cement usually sold by the Japanese is of two grades, Asano and Onoda cement being in the first grade and Toa, Sakura, and Chuo cement in the second. The first grade compares favorably with the best grade of cement manufactured in the United States.

The following table shows the annual production, annual sales and the amounts carried forward to the next year for the years 1911 to 1914 and from 1919 to 1922 :

(In thousands of barrels)

Year	Annual output	Annual sales	Carried to next year	Year	Annual output	Annual sales	Carried to next year
1911	3,193	2,370	482	1919	6,445	6,236	666
1912	3,804	3,305	981	1920	*7,852	7,767	894
1913	3,742	3,678	1,044	1921	8,300	7,900	934
1914	3,625	3,861	809	1922	†10,723	—	—

The output for 1921 showed an increase of some 500,000 barrels and the sales also an increase of about 140,000, barrels, as compared with those of 1920. The annual demand figures, shown by sales in the above table, can be divided as domestic demand and foreign demand or the consumptive volume at home and for export. Cement exportations in 1921 showed an increase of 189,000 barrels and home demand an increase of 56,000 barrels over those of 1920. Further figures are given in the following table :

[In thousands of barrels]

Year	A. Total sales	B. Exports	B's per cent. of A	C. Domestic consumption	C's per cent. of A
1913	3,678	303	8.2	3,375	91.7
1914	3,862	436	11.3	3,426	87.6
1919	6,236	1,256	20.1	4,891	79.8
1920	7,767	1,285	16.5	6,482	83.4
1921	7,900	1,474	18.6	6,426	81.3

From the above table it can be seen that demand for cement for consumption in foreign countries and in Japan has been on the increase since the termination of the European war. In 1919 and later years considerable amounts were used in the establishment of hydroelectric systems in Japan. After a temporary depression in this field domestic demand for cement was again increased in the latter part of 1921, resulting in an advance in price.

As a result of the recent disaster in Japan the demand for cement will increase to such an extent that the former exportable surplus will be consumed at home. As most of the cement mills are situated in Kyushu and Kwansai, only 8.2 per cent. of the whole producing capacity was affected by the earthquake. The annual productive capacity of the Kawasaki mill of the Asano Cement Co., near Yokohama, is about 1,500,000 barrels. Fortunately, very small damages to this mill were reported, only two smokestacks and two kilns being destroyed. The Fukagawa mill, controlled by the Asano Cement Co., however, did not fare so well, being completely burned. The yearly producing capacity of this mill was about 700,000 barrels, and the loss is estimated at Y.3,000,000. The mill operated by the Suzuki Cement Co. (Ltd.), located in Sunamura, Oshima, Tokyo-fu, was also completely burned. The productive capacity of this mill was about1 80,000 barrels a year. The loss is estimated at from Y.500,000 to 600,000.

Before the Japanese disaster cement was used principally in the construction of office buildings, warehouses, and hydroelectric plants. Japan was also planning an extensive system of highways in which cement was to figure prominently.

In the present situation of domestic and foreign demand for cement more output and more demand is expected for the coming year, both in connection with the reconstruction of the devastated area and in the carrying out of new projects.

Exports

The annual return of the foreign trade of Japan shows that exports have gained considerably each year since 1911. During the years 1911 to 1914 Japan exported on an average of 51,085,000 pounds of cement, valued at $280,860. The Kwangtung province in China was the best customer during this period, purchasing about 27,257,000 pounds, with a value of $159,004, or 53 per cent. of the total quantity and 57 per cent. of the value. The Philippine Islands took 10,905,000 pounds, valued at $51,125, or 21 per cent. of the amount exported and 18 per cent. of the value. The United States imported only a trival amount, 12,000 pounds, valued at $16 during this period.

In 1919 Japan increased its exports over the average for the years 1911 to 1914 by 747 per cent. The exports amounted to 381,824,000 pounds, of which the Kwangtung province took 157,140,000 pounds, or 41 per cent. of the total. The Dutch East Indies was the next best customer, importing 92,490,000 pounds, or 24 per cent. of the total.

In 1920 there was a considerable increase over the export figures for 1911-1914, amounting to 851 per cent. Of the total exports of 441,161,000 pounds the Dutch East Indies took 163,059,00

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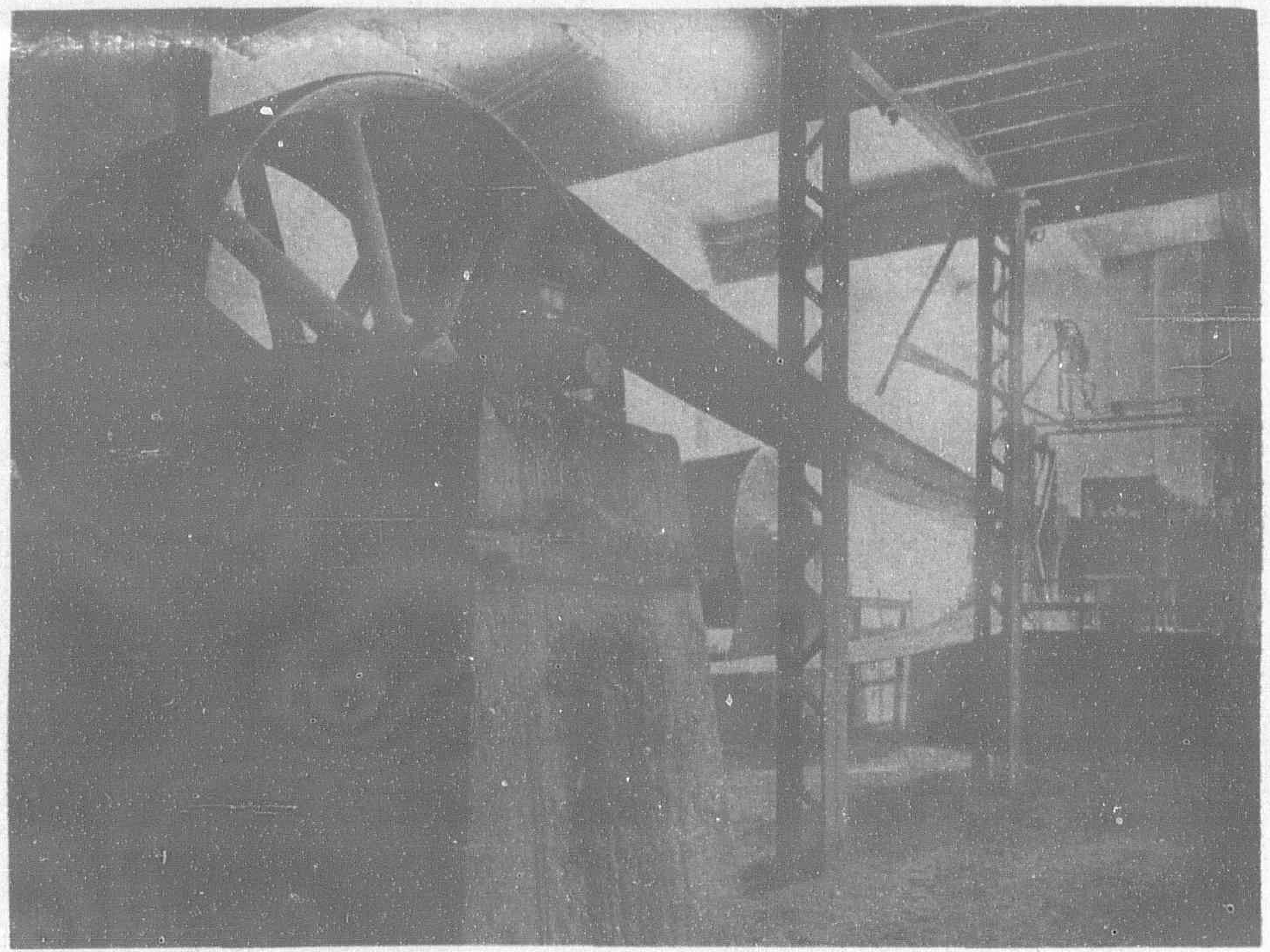
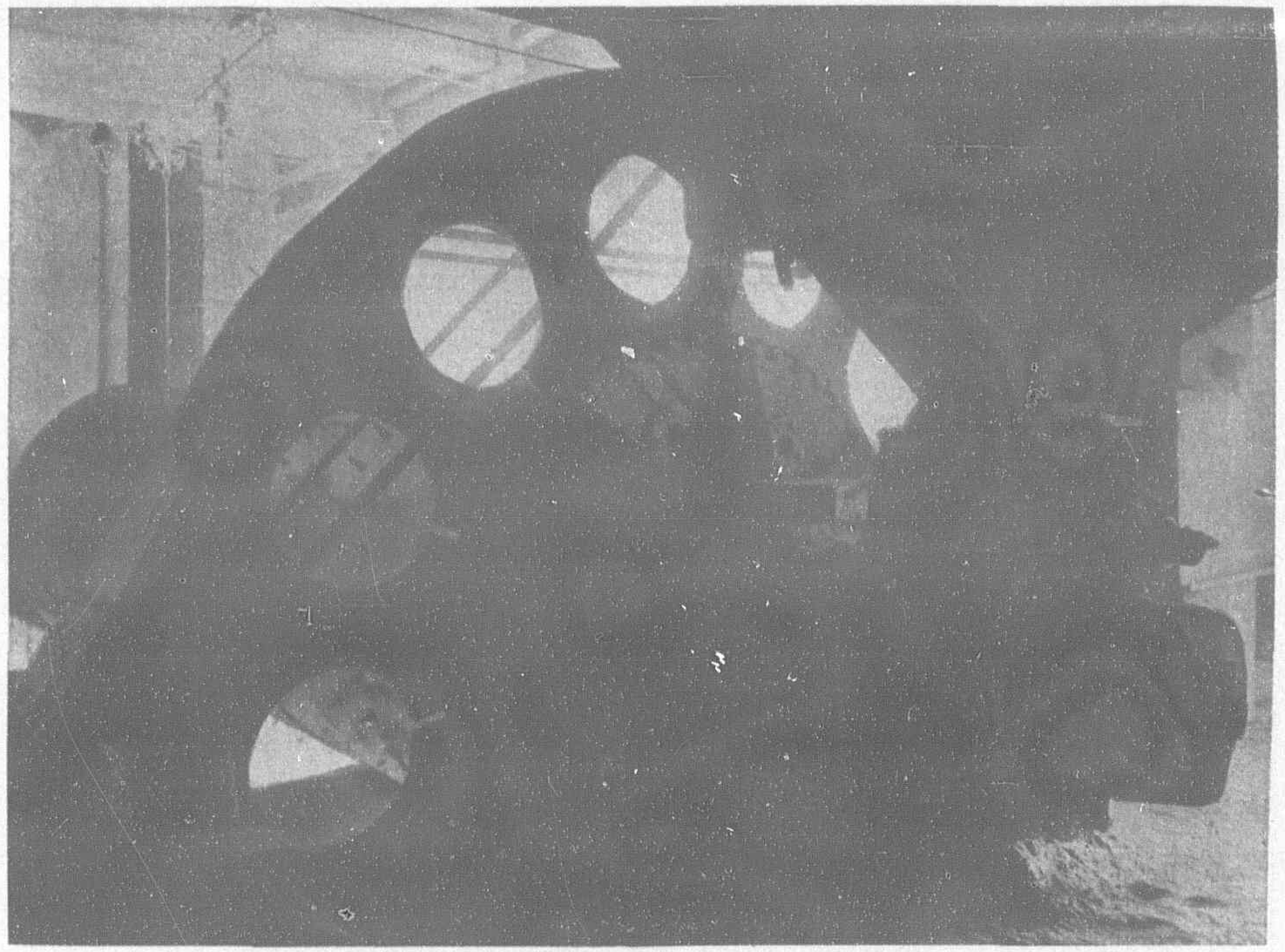
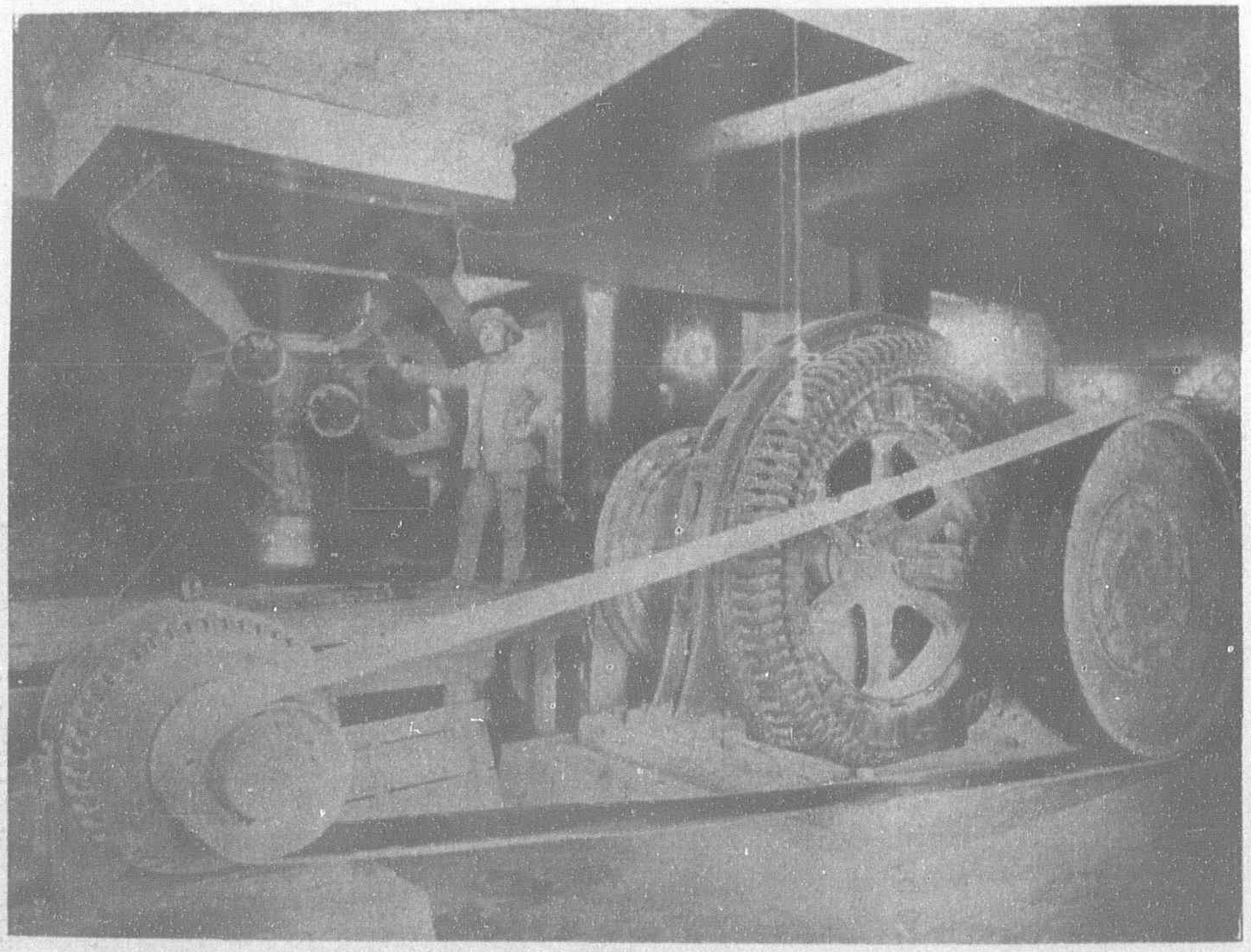
*Approximate output.
†Estimated requirements.



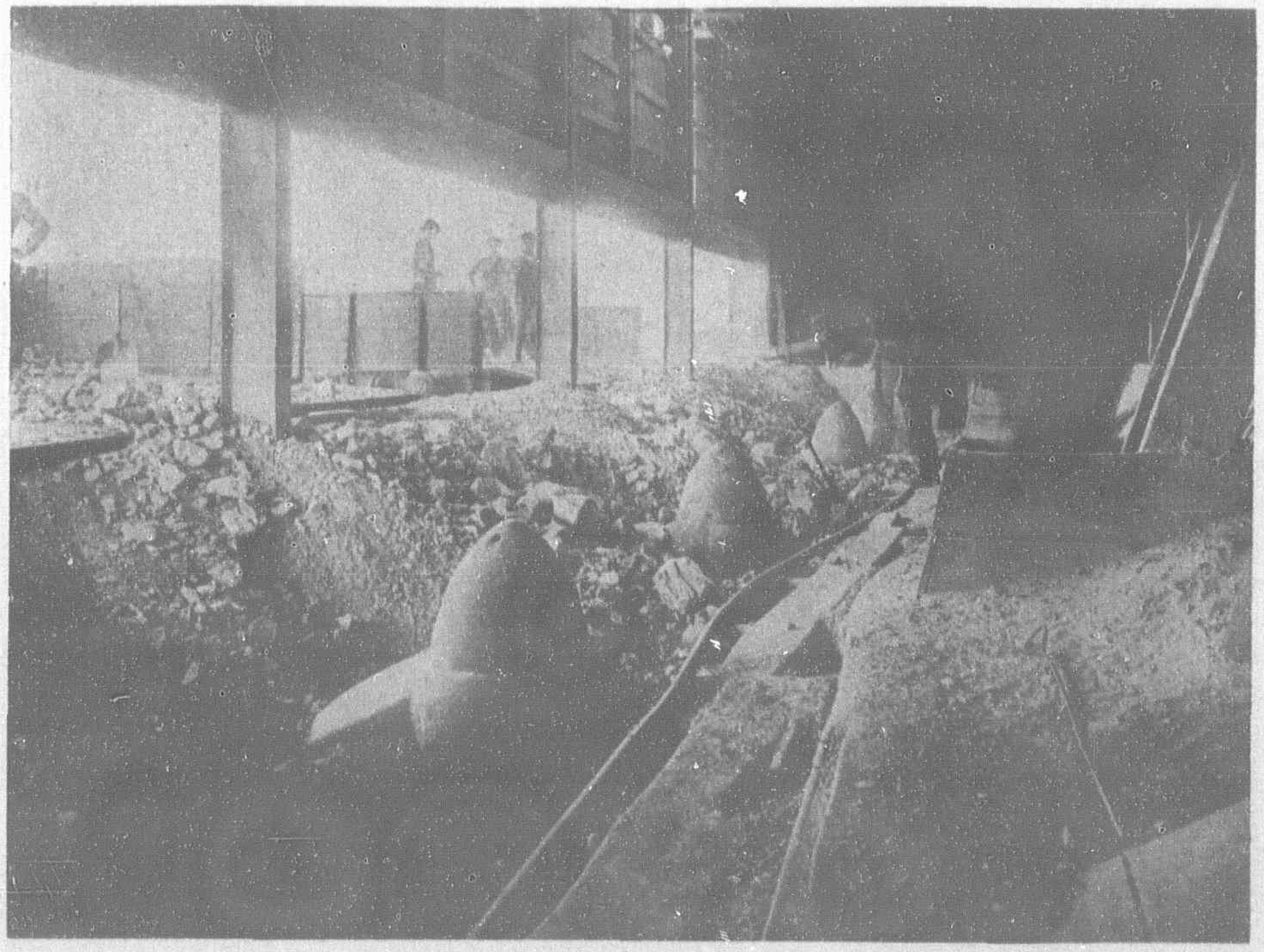
Compeb Mill Belt Drive from Allis-Chalmers Motor.



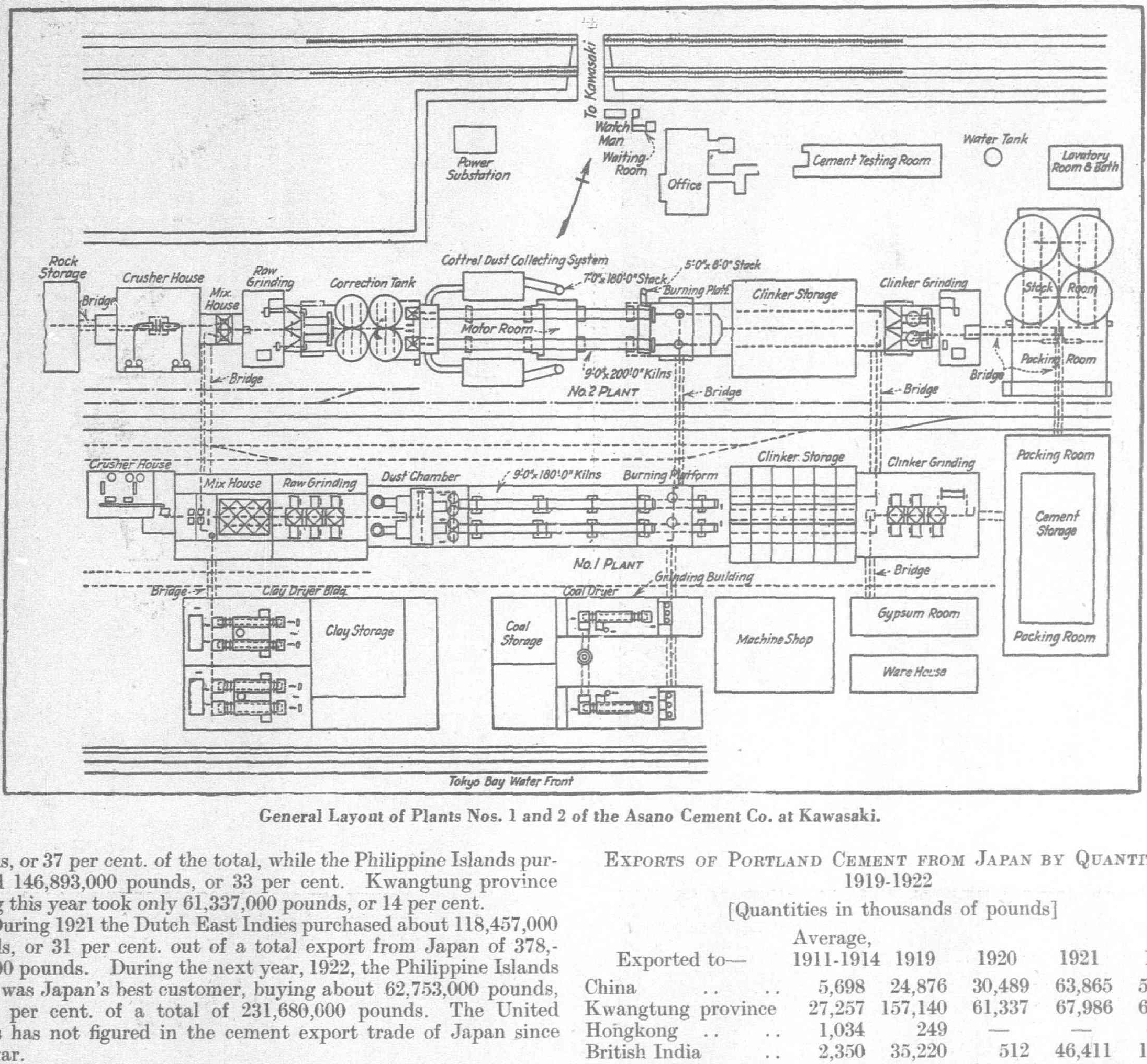
Allis-Chalmers Compeb Mill, Feed End.



Allis-Chalmers Synchronous Motor (Driving Compeb Mill through Magnetic Clutch) with Belt Driven Exciter.



Allis-Chalmers Gyratory Crushers.



General Layout of Plants Nos. 1 and 2 of the Asano Cement Co. at Kawasaki.

pounds, or 37 per cent. of the total, while the Philippine Islands purchased 146,893,000 pounds, or 33 per cent. Kwangtung province during this year took only 61,337,000 pounds, or 14 per cent.

During 1921 the Dutch East Indies purchased about 118,457,000 pounds, or 31 per cent. out of a total export from Japan of 378,451,000 pounds. During the next year, 1922, the Philippine Islands again was Japan's best customer, buying about 62,753,000 pounds, or 27 per cent. of a total of 231,680,000 pounds. The United States has not figured in the cement export trade of Japan since the war.

VALUE OF EXPORTS OF PORTLAND CEMENT FROM JAPAN, 1911-1914

Exported to—	1911	1912	1913	1914	Average, 1911-1914
China	$37,716	$17,510	$22,630	$57,061	$33,729
Kwangtung province	116,547	89,961	223,625	205,884	159,004
Hongkong	—	—	2,832	19,151	5,496
British India	—	—	9,078	37,183	11,565
Straits Settlements	—	—	3,645	12,458	4,026
Philippines	7,983	8,466	62,626	125,424	51,125
Dutch East Indies	—	—	—	33,969	8,492
Russia (Asia)	—	—	—	3,514	878
Siam	—	—	—	8	2
British America	—	—	—	122	31
Peru	—	—	—	18	4
Australia	—	—	—	1,911	477
Hawaii	—	—	—	5,972	1,493
Chile	—	—	—	—	—
Brazil	—	—	—	—	—
United States	—	—	—	63	16
All other countries	1,451	2,432	2,473	11,729	4,522
Total	163,697	118,369	326,909	514,467	280,860
Average price per 100 pounds	.61	.61	.55	.52	.55

Source: Annual return of the foreign trade of empire of Japan.

EXPORTS OF PORTLAND CEMENT FROM JAPAN BY QUANTITY, 1919-1922

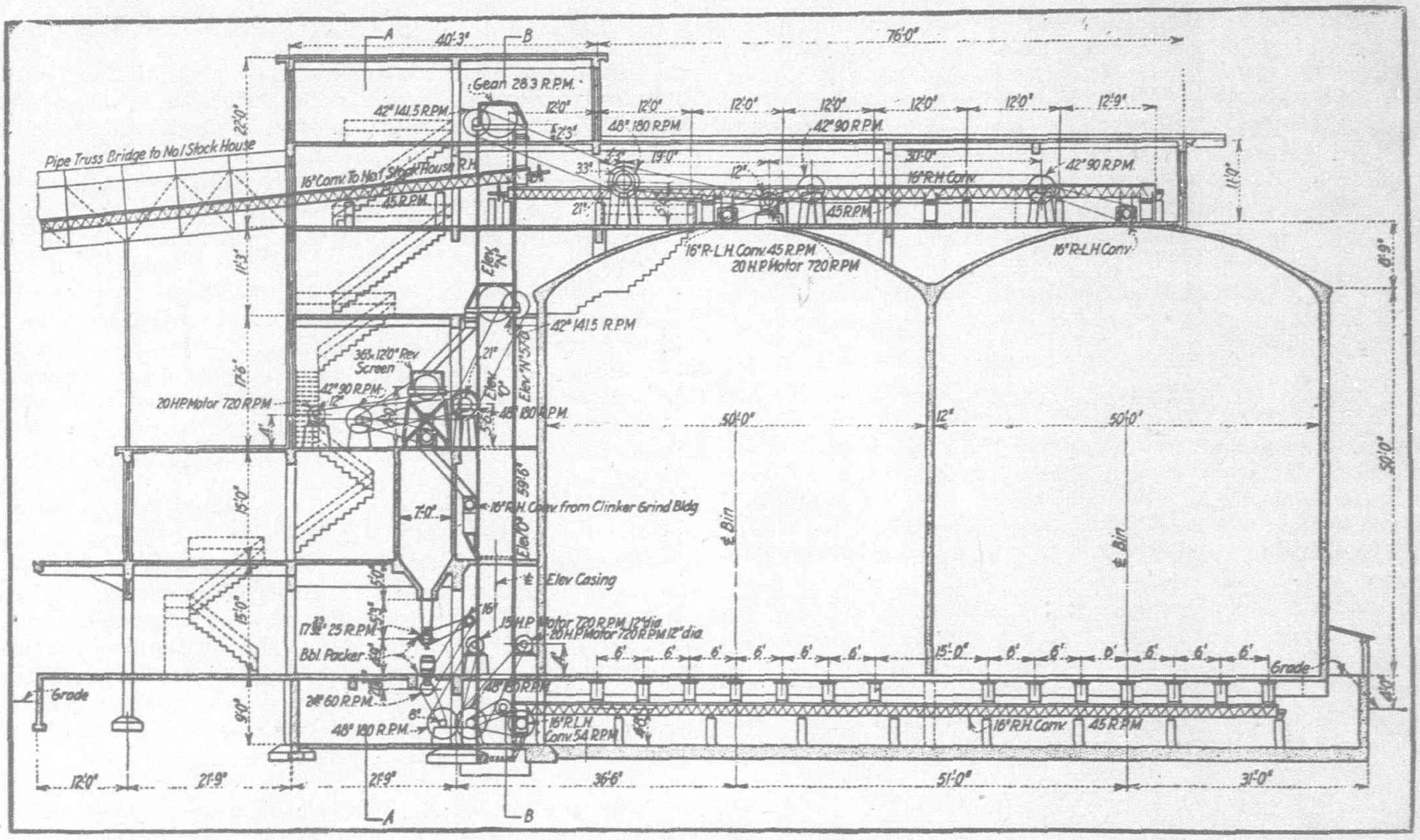
[Quantities in thousands of pounds]

Exported to—	Average, 1911-1914	1919	1920	1921	1922
China	5,698	24,876	30,489	63,865	58,343
Kwangtung province	27,257	157,140	61,337	67,986	60,547
Hongkong	1,034	249	—	—	—
British India	2,350	35,220	512	46,411	11,802
Straits Settlements	767	17,838	24,375	5,433	1
Philippines	10,905	49,738	146,893	60,646	62,753
Dutch East Indies	1,563	92,490	163,059	118,457	32,679
Russia (Asia)	174	717	—	—	—
British America	5	—	—	—	—
Peru	1	864	—	—	—
Australia	89	—	—	—	—
Hawaii	312	—	—	—	—
Chile	—	1,881	—	—	—
Brazil	—	79	—	—	—
United States	12	—	—	—	—
All other countries	918	732	14,496	15,653	5,555
Total	51,085	381,824	441,161	378,451	231,680

Source: Annual return of the foreign trade of the empire of Japan. Frontier values are shown in this statement, which represent cost and charges of delivery on board the vessel at the port of exportation.

NOTE.—Detailed statistics are not yet available for 1923. The total exports of Portland cement for the five months period January to May amounted to 45,870,000 pounds.

From the small beginning made by Mr. S. Asano in the Fukagawa Cement Works, he has gradually increased his investments in the industry until to-day the Asano Cement Company operates seven of the largest plants in Japan producing 9,000,000 barrels annually or nearly fifty per cent. of the total output of the country, which is roughly 20,000,000 barrels. These works are located, one at Fukagawa (Tokyo), one at Moji, two at Toshima in Hokkaido,

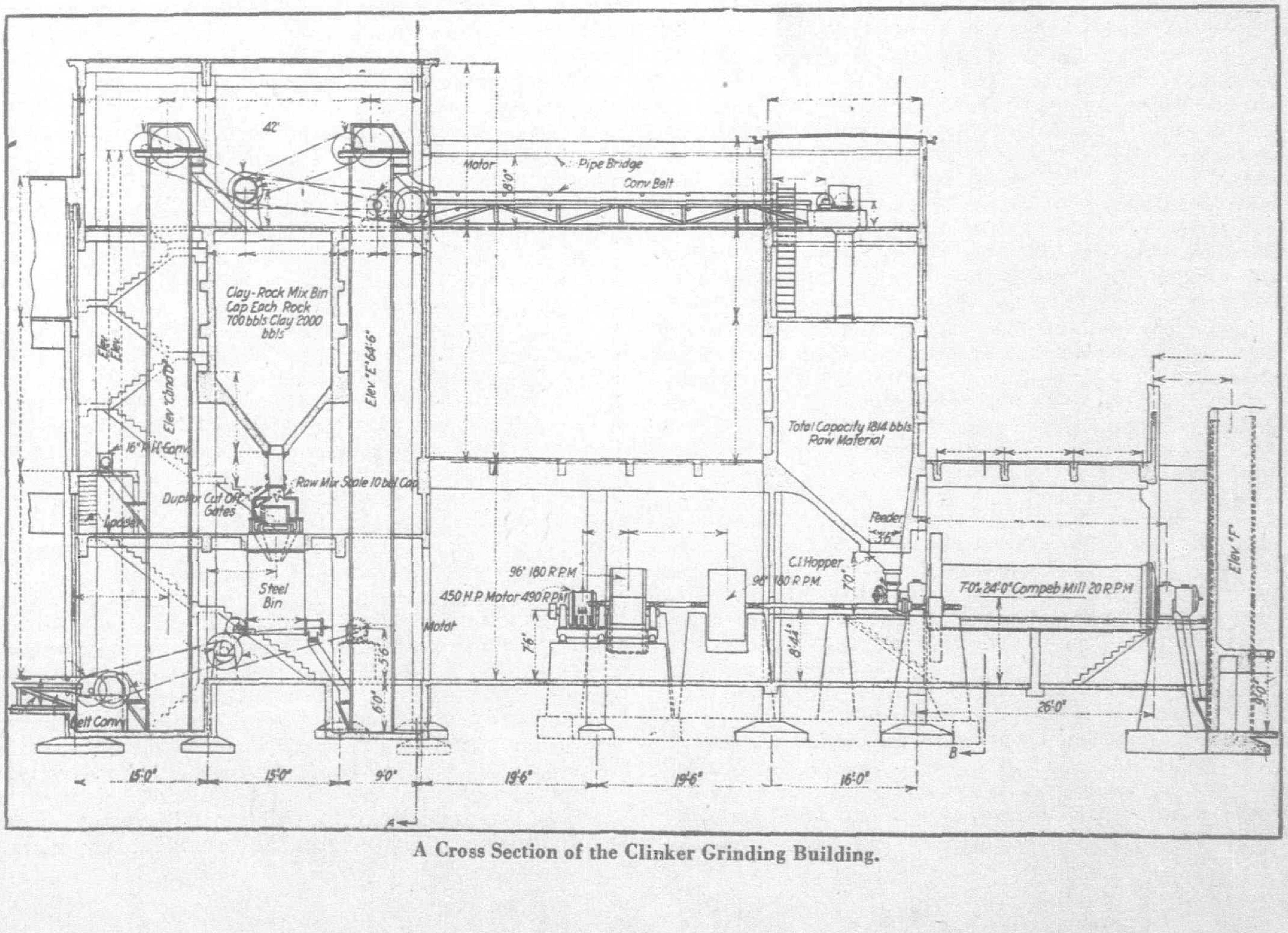


Longitudinal Elevation of Cement Stock House.

one at Takao, Formosa, and two at Kawasaki, near Tokyo. The Kawasaki plant, the most up-to-date, was built in 1914 on reclaimed land on the bay between Tokyo and Yokohama near the village of Kawasaki, in the prefecture of Kanagawa. When the plant was completed, a second unit was at once projected and Paul C. Van Zandt, at that time sales engineer for the Allis-Chalmers Mfg. Co., went to Japan to negotiate for the sale of the machinery for that company through their agents, the American Trading Co., of New York and Tokyo.

Mr. Van Zandt was placed in charge of the design and construction of the second Kawasaki unit as consulting engineer for the Asano Cement Company. Later Mr. Van Zandt became chief engineer of the Asano Cement Company, in general charge of the engineering operation and construction of all the plants of that company, which position he now holds.

The detailed and working drawings were all made under the supervision of John A. Roberts, cement plant designer of Allis-Chalmers Mfg. Co., who followed Mr. Van Zandt to Japan and



A Cross Section of the Clinker Grinding Building.

organized a competent drafting force from the engineering staffs of the cement company and the Tokyo office of the American Trading Co. Work on the new plant commenced in the fall of 1917 and completed the latter part of 1919. Every modern thought with reference to plans and equipment was embraced in the latest installation of the Asano Cement Co. The buildings and binwork are entirely of reinforced concrete and the machinery units are of the latest and most up-to-date manufacture. No American cement plant surpasses it in the " concrete-for-permanence " type of construction.

The new No. 2 plant at Kawasaki began operations in October, 1920. The Nos. 1 and 2 plants combined have a total capacity of 5,000 barrels of cement per day.

Raw Materials

The limestone quarries which supply the main ingredient in the manufacture of cement are located about 25 miles west of Tokyo and about the same distance from the plant. The rock on being received at the plant is unloaded in a rock storage, which is covered and has a capacity of about 30,000 tons. The limestone obtained from these quarries is very dense, containing only surface moisture and as a result of this drying of the rock is not necessary.

The clay which is obtained from a quarry near Yokohama supplies both silica and alumina. This is also brought in on cars and deposited in a covered storage having a capacity of 20,000 tons. From the storage the material is run through a set of slugger rolls which reduce the material to a suitable size for passage through the dryer. No. 1 plant originally had two 6 by 60-ft. indirect heat dryers for drying the clay, but these were found not to be sufficient, due to the high percentage of moisture. (The clay contains from 20 to 30 per cent. moisture). The clay after leaving the rolls is reclaimed by a bucket elevator which deposits the material in a feed bin at the head end of the dryers. In the dryer building for the No. 2 plant the material is then fed in to two 8 by 60-ft. single-shell, direct fired dryers by 18-in. reciprocating feeders. The extra large dryer here affords greater capacity. The two drying buildings are so arranged that the material from either one can be sent to either the No. 1 or the No. 2 plant.

Removal of Dust and Gases

An interesting feature in the operation of the dryers is the collection of dust and gases. In the drying of the clay considerable fine dust is created, which had a tendency to settle on a Buddhist temple that is located in close proximity to the cement plant. The high authorities of the temple raised considerable fuss over this. To obviate this nuisance and keep the temple clean it was necessary to install a system which would remove the dust created in the operation of the dryers.

At the head end of the dryers is a concrete dust chamber which connects to both of the dryers. The gases are exhausted from this chamber by means of a fan and discharged into a 12-ft. concrete cyclone collector. From the cyclone the gases pass into a Cottrell electric dust precipitator 10-ft. wide and 30-ft. long which removes all remaining dust.

The clay on leaving the dryers is conveyed either to a storage bin or the material is elevated to an overhead screw conveyor on a bridge spanning the railroad tracks, where it is conveyed to the mix bin in Plant No. 2. (The different storages are shown in an accompanying drawing showing a general layout of the plant).

Crushing Plant

There are four No. 5 gates gyratory crushers. The rock is dumped into any one of these gyratories from the cars and is reduced to about 1½-in. size. The top of the crushers is about on a level with the ground line. The material from the crushers is reclaimed by two No. 5 bucket elevators of 64-ft. centres, which discharge the material into two 40-in. by 16-ft. screens.

The material under 1-in. goes through the screens and onto a 24-in. belt conveyor located just a little above the grade line. The material over 1-in. drops from the screens into bin located over a set of 54 by 24-in. Anaconda rolls, which reduce the over-size for conveying to the raw mill. The 24-in. belt conveyor under the rolls delivers the material to an elevator which deposits it in a raw-mix bin having a capacity of 770 barrels of rock and 2,000 barrels of clay.

Raw Grinding

The clay is brought over direct from Plant No. 1 in a 16-in. screw conveyor which deposits the material into an elevator at a point 24-ft. above the belt conveyor. It is then elevated and deposited in the raw-mix bin.

Underneath the raw-mix bin are two scales of five and three tons capacity, respectively, which weigh out the correct proportions of the materials and discharge them into a steel hopper directly underneath. From this hopper the mixed material is fed by a reciprocating feeder into an elevator which elevates it to the feed tanks of the raw grinding machines. These feed tanks have a combined capacity of 1,814 barrels and serve two Allis-Chalmers No. 724 compeb mills. The material is fed from these bins into the compeb mills through an improved type Allis-Chalmers style " B " feeder. The compeb mills are belt-driven from 450-h.p. motors and run at 20 r.p.m.

Correction Bins

The finely ground raw material on being discharged from the compeb mills is reclaimed by an elevator which deposits it in a 16-in. screw conveyor located over the four correction tanks, which are 30-ft. in diameter and 40-ft. high, and which have a capacity of 21,042 barrels. Underneath each tank there are four feeders which discharge into a central 16-in. screw conveyor which takes it to an elevator, depositing it into two kiln feed bins ahead of the kilns. These bins have a capacity of 415 barrels each.

It is the practice here to draw about twice as much material as is required to keep the kiln full at all times, the overflow going into an elevator which returns it back to the bins. In this way there is a complete circuit of material, which enables the chemist to have proper control of his mix at all times.

Kilns and Coolers

Underneath each kiln feed tank is located a 7-in. half pitch screw conveyor, which, in turn, feeds a 9-in. water-jacketed screw conveyor running through the dust chamber at the head end of the kilns. The speed of both screw conveyors is controlled by means of a No. 2 Reeves speeder. The material through the water-jacketed screw conveyor is fed into two Allis-Chalmers kilns, which are 9-ft. in diameter and 200-ft. long. The dust from the dust chamber is reclaimed by means of a screw conveyor to an elevator which deposits it for re-mixing in the correction tanks.

The material discharging from the kilns drops into two 8-ft. by 60-ft. coolers through a cast-iron spout supported by a brick pier. As the clinker discharges from the coolers it is reclaimed by bucket elevators and deposited on a 24-in. drop pan conveyor, which distributes the clinker over the clinker storage.

The company is installing waste-heat boilers at the present time.

Coal Mill

The coal brought to the plant in boats from Yokohama and at present loaded by coolies, each carrying two small baskets supported by a yoke over his shoulder.

The coal in the baskets is set on a platform scale by the coolies, and the attendant at the scale either adds to or takes away enough coal to make the scale balance. He then records the amount and in this way records are kept of the exact amount of coal used. The coal is then dumped into the coal storage at Plant No. 1. Here again, the coal is loaded into wheelbarrows and taken by coolies to a hopper feeding a bucket elevator which deposits the coal to a coal bin situated at the head of the coal dryer.

The coal is fed to the dryer from the coal bin through an 18-in. reciprocating feeder. The coal drier is 6 by 60-ft. indirect heat type, stoker-fired. As the coal is discharged from the dryer it is reclaimed by a bucket elevator and distributed over three coal bins ahead of three 42-in. Fuller pulverizing mills. There are two dryers used and consequently six pulverizing mills. From the Fuller mills the pulverized coal is elevated and conveyed to the pulverized coal bin located on the burning platform. The pulverized coal is fed from each bin by two 6-in. screws, which discharge into an Allis-Chalmers coal injector, and it is then picked up by air furnished by a No. 10 American blower and discharged into the kilns.

Clinker Storage

The clinker storage, which is illustrated by accompanying photographs and drawings, is built entirely of reinforced concrete. The roof over the storage is of the three-hinged arch type, the arches being of special design. There is a total capacity of 68,400 barrels. The building is 48-ft. high and 90-ft. across centres.

Clinker Grinding

On reclaiming the clinker it is drawn through V-shaped openings in the roof of the tunnels underneath the clinker storage onto two 24-in. belt conveyors discharging into two elevators which deposit the clinker into two clinker bins ahead of two No. 724 Allis-Chalmers compeb mills. The clinker bins have a total capacity of 2,767 barrels.

The gypsum is conveyed over from a storage in Plant No. 1 and deposited in a gypsum bin of 18 tons capacity located in the clinker storage grinding room directly over the incoming belts from the clinker storage by a feeder, which is belt-driven from the head end of the belt conveyor. The amount of gypsum being fed is regulated by clinker scales.

The material from the clinker bins is fed into two Allis-Chalmers No. 724 compeb mills through style "B" feeders. As the pulverized clinker leaves the compeb mill it is reclaimed by an elevator which sends it to the stock house.

Storage and Packing

The cement conveyor from the compeb mills discharges into an elevator which in turn discharges into a 16-in. screw conveyor over the stockhouse. This conveyor distributes its material to any one of four reinforced concrete silos, 50-ft. in diameter and 50-ft. high, having a capacity of 25,000 barrels of cement each.

As the material is required for packing it is drawn from under the silos into screw conveyors, which deposit it in an elevator. This elevator then spouts the material to two revolving screens. The fines from this screen are conveyed to the packing bin located above barrel packers.

Until now nearly all the cement in Japan has been packed in wooden barrels and 10 barrel packers and one 4-tube Bates valve bag packer have been installed in this plant. The cement is fed to the barrels from the bin by means of a revolving feeder. The barrel is set on an iron disc or platform, which is vibrated from a line shaft underneath by means of cogs of different pitch. This causes the cement to settle so that the required quantity may be put in the barrel (380-lb.) When packed in bags, the bags weigh 95-lb. each From the packing room the barreled cement is loaded into cars.

Power Plant

The plant is electrically-driven throughout. The power is purchased from a hydro-electric company also owned by Mr. Asano and received at a sub-station on the company's property. All motors over 50 hp. are three-phase, 50-cycle, 3,300-v., alternating current. The small motors are three-phase, 50 cycle, 500-v.

The cement plant itself is located on reclaimed ground, for prior to the time of filling in the land the property at high tide was completely under water. The property on which the plant stands covers some 100,000 *tsubi* (about 80 acres) and it required approximately 30,000 *tsubi* (240,000 cu. yds.) for filling in.

In building this Plant No. 2, it is interesting to note that there was required 833 tons of steel, 14,400 yd. of concrete, and 22,600 barrels of cement. The machinery foundation alone required 3,500 yards of concrete.

Statistics of Japanese Cement

In 1917 the total production of cement in Japan was 4,000,000 barrels, and of this the Asano Cement Co. produced 1,944,000 barrels or approximately half of the entire output of Japan. The Asano Cement Co. has seven plants in Japan, two at Hokkaido, one at Tokyo, two at Kawasaki, one at Moji, and one at Formosa. These plants are the most modern in the Far East. Mr. Asano has installed modern grinding units in all of his plants and has thereby increased the capacity and cut the costs at his plants considerably. The new No. 2 plant at Hokkaido is also of reinforced concrete, of 1,800 barrels capacity, and was built along the same lines and at the same time as the Kawasaki plant.

Another recent and very important change is the installation of a crushing plant at the quarry. The rock is crushed in a No. 8 gyratory crusher. The cars are brought underneath a bin and loaded by gravity instead of hand.

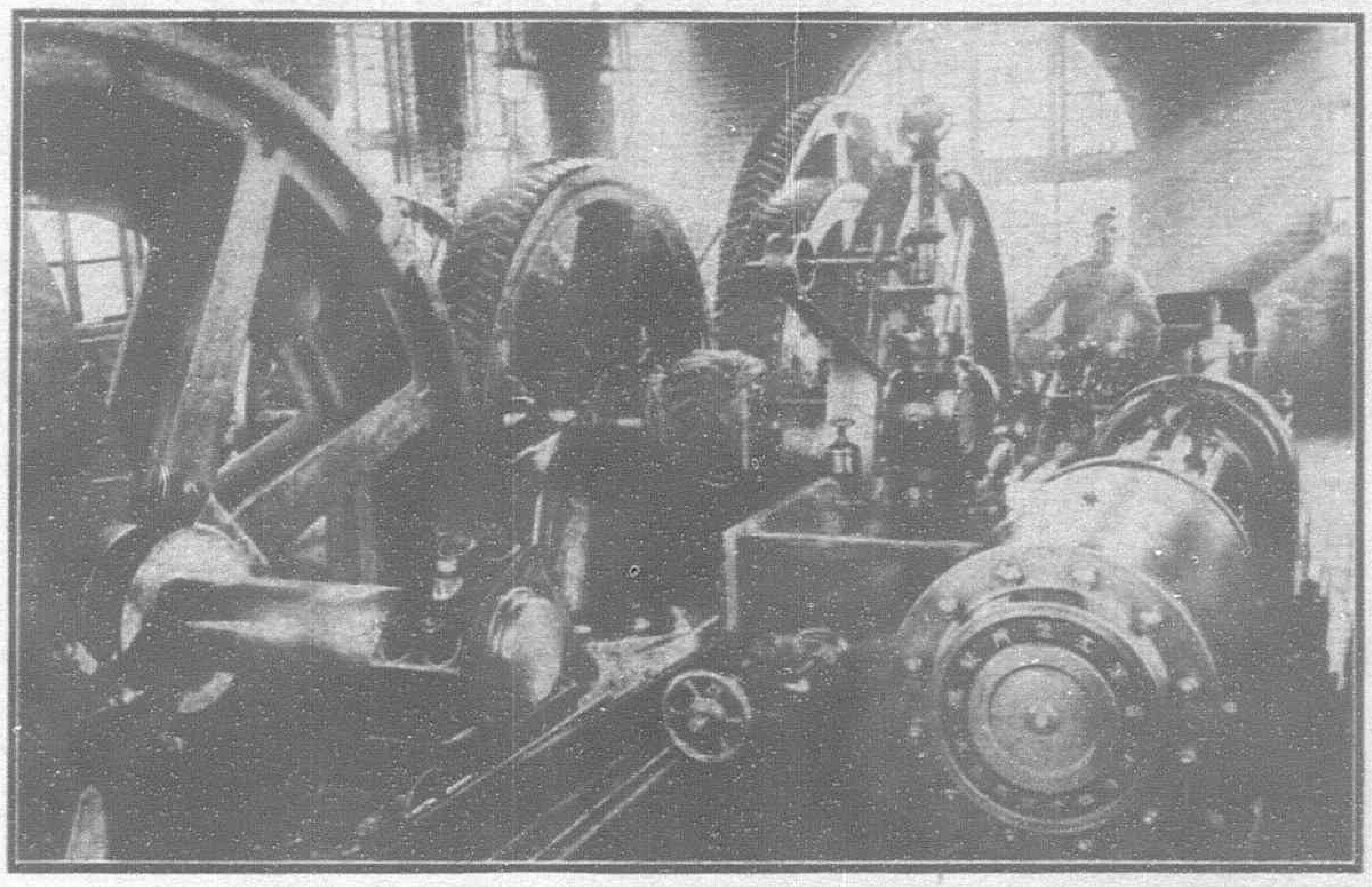
PENCHIHU

(Continued from page 63)

cubic meters of air at a pressure of six pounds to the square inch, taking 840 horse-power for blowing each furnace blast. The plant is also equipped with dust collection apparatus that screens the furnace gases before they pass into the flues of the stoves for heating the air blast on their way to be burned under the boilers of the power house.

Iron Supply

The iron for the Penchihu furnaces comes largely from the Miaoehrkau deposits estimated to contain about 80,000,000 tons, of which a fair proportion is a variety of magnetite containing 70 per cent. of iron, the rest being a low grade ore averaging between 30 and 40 per cent. of iron. The daily output from these workings has been about 200 tons but with the new improvements that have been installed this tonnage will be doubled. The cost of mining this ore and delivering it to the furnace is said to be about Y.2.50 per ton. In addition to the Miaoekrkau deposits there are upwards of 120,000,000 tons of low-grade ore in the immediate vicinity of Penchihu which will form a cheap and almost inexhaustible supply if the new process of roasting and concentration now being tried out at Anzan proves a success. The richer vein at Miaoehrkau has already been worked to a depth of nearly 500-ft. and although there is sufficient of this ore to keep going with for some years, the supply is limited and cannot be depended upon as the mainstay of the industry.



Hoisting Engine of No. 1 Pit, Made in Japan

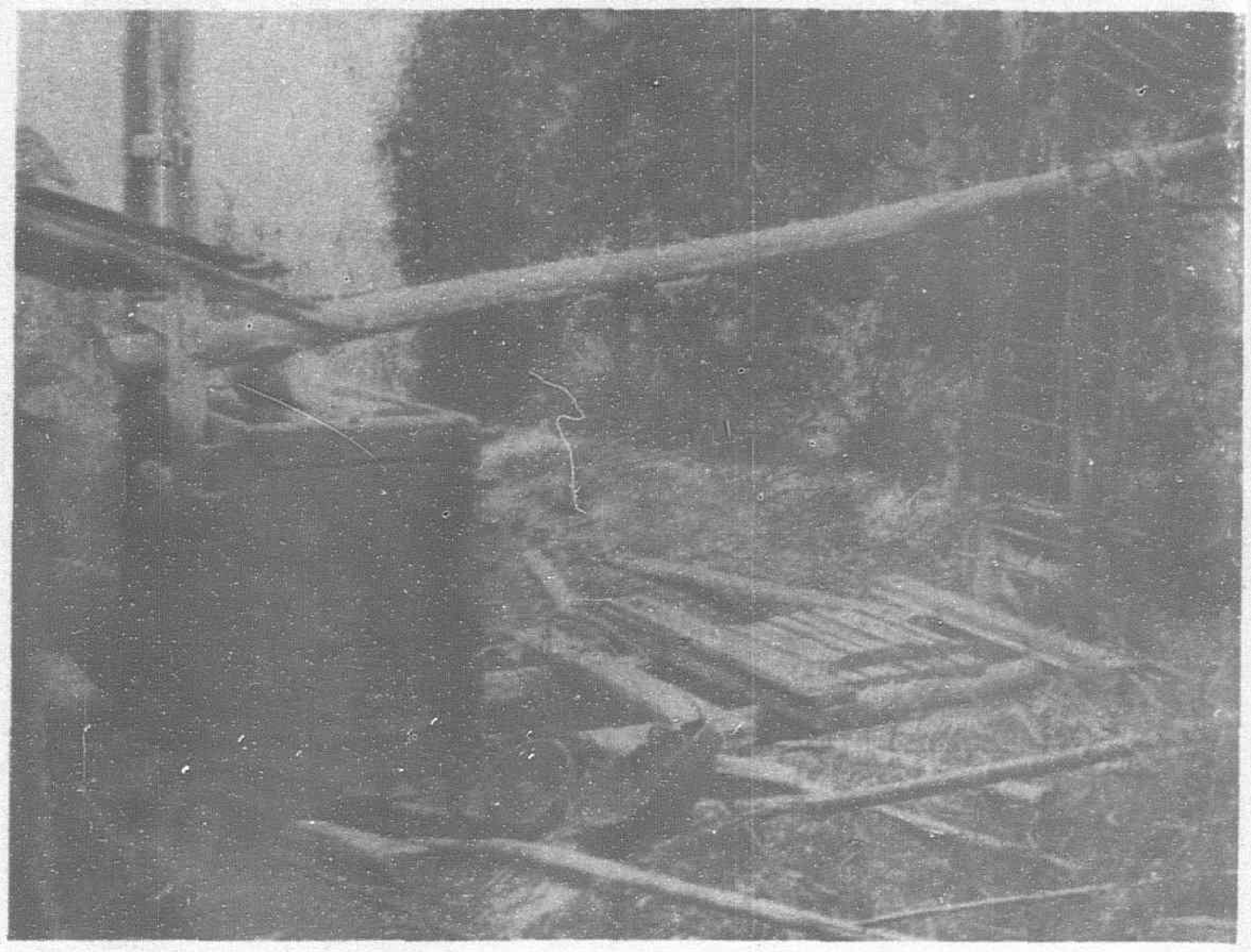
From the working shafts at Miaoehrkau an endless cable railway transports the ore to a loading bin or station from whence it is loaded into the cars of a light railway operated by the company and delivered to the S.M.R. cars at Nanfen or to the concentration plant near this station. This plant operated on the Grondahl system has a capacity of 125 tons per day.

In addition to the Miaoehrkau mines the company was conceded permission in 1915 to develop and operate twelve other iron mines in the same district. Development work is proceeding on two of these properties located at Tungyuanpao and Paiboonling both located in the Fenchi district of Fengtien province.

Buffers for Indian Railways

Another contract has just been placed by the India office, with Messrs. George Turton, Platts & Co., of Sheffield, for 4,500 large steel buffers for Indian railways. These buffers are duplicates of the 6,500 already reported in THE FAR EASTERN REVIEW, ordered from the same firm for the East Indian railway.

Boatloads of Straw Carried to the Paper Mill



An Ancient Process for Making Bamboo Paper

Paper Making in China

PAPER manufacturing, which China discovered in the first century, continues to be one of the most important industries in the country, according to *The Chinese Economic Bulletin*. Instead of wood or rags, Chinese paper manufacturers use rice straw, bamboo and the bark of several species of trees. Paper manufacturing centres in China are found all over the southern provinces from the Yangtze regions southward. Wherever rice is cultivated and bamboo groves grow, the industry thrives. Numerous varieties of paper are produced in these provinces, each having some particular use. They may be divided into two main groups: (1) those made from rice straw and tree bark and (2) those made from bamboo. Of the first group, Hsuan paper may be taken as representative. Hsuan paper is produced chiefly in Anhwei province. Hsuan-cheng, a *hsien* district in the province, being the best known manufacturing centre, hence Hsuan paper.

Hsuan paper is made from a mixture of straw and tree bark pulp, which for ordinary quality purposes, contains about 70 per cent. straw pulp and 30 per cent. bark pulp. The percentage varies with the quality of the paper to be made, the presence of a higher percentage of bark pulp improving the quality. The bark is obtained from a kind of brushwood of the Ulmaceae family known in Chinese as Tan tree. It grows in a wild state on the hillsides in the Yangtze valley regions, and is sometimes specially cultivated by paper manufacturers for its bark. When full-grown it reaches a height of over ten feet, and has numerous branches. The bark is obtained chiefly from the branches which are cut in winter time. The bark is peeled and reduced to pulp by boiling.

The process of boiling the raw materials is done by means of a basin-like iron boiler about five feet in diameter. The bottom is lined with pieces of board so as to prevent contact of the raw material with the bottom of the boiler, which would otherwise be spoiled by over-heating. In the case of straw the raw material is done up into neat bundles and placed in the boiler, into which lime and water are added until the straw bundles are entirely immersed. Firewood is usually used as fuel in the boiling, which lasts for a certain period of time, determined by the experience of the workmen. After boiling the contents are allowed to remain in the boiler to cool. A piece of cloth is often used to cover the boiler to prevent its contents from coming in contact with the air too suddenly. After cooling the straw bundles are taken out and washed clean of any lime solution. The same process of boiling is repeated once more before the straw is ready for bleaching Tan bark is treated in the same manner; but instead of twice as in the case of straw, bark is boiled three times before it is bleached.

Bleaching forms the slowest and most tedious part of the process of paper manufacturing. Instead of using chemicals, Chinese paper manufacturers depend entirely upon sunlight as the bleaching agent. After the raw material is boiled and washed clean of lime, it is placed in a sunny place, generally on the sunny slope of a hillside. Water is sprinkled on the raw material as soon as it becomes dry. This goes on for several months—seven months for straw and five months for tan bark—until the sun completes its work. The bleached material is then reduced to pulp in a wooden mortar by pestling, which is done by means of a traddle, worked by one man in the case of straw. Tan bark, however, requires further pounding on a stone slab after it has been brayed in the mortar. In this case, two men are required; one working the pestle and the other moving and shifting the partly-converted pulp to insure a thorough pounding.

Each kind of pulp is then stored in an earthenware jar. For making the common Hsuan paper, 30 per cent. of tan bark pulp and 70 per cent. of straw pulp are mixed in a wooden tank containing water. Generally, about 50 catties of the mixture is put into each tank, but the proportion of the pulp to the water in each tank is determined entirely by the judgment and experience of the workmen. A liquid rich in starch and made by boiling yam is poured into the tank to add cohesion to the pulpy mass. The thickness of each sheet of paper to be made depends entirely on the percentage of the liquid present in the material. When thus prepared, the pulp is taken out of the tank, strained in a wickerwork basket and spread in a thin layer on a piece of board or a bamboo screen. The layer of pulp thus spread is partly dried by the operation of a rolling-pin passing over the surface. This squeezes out the free water. The drying chamber consists of two rooms partitioned by a thick brick wall hollowed inside. A fire is built inside the wall so as to give a heating effect on both sides, which are made glossily smooth by spreading a thin layer of starch over their stucco surface. The partly dried sheets are removed from the bamboo screen and laid on either side of the wall to complete the drying process. The dried sheets are ready for the market after trimming and cutting into the desired size and shape. The drying chamber is generally a tile-roofed hut, well-ventilated, with numerous holes all over the roof to facilitate the escape of moisture from the drying sheets.

There are two varieties of Hsuan paper: one four feet by two feet known as Sze Chi Liao Pan and the other six feet by two feet eight inches known as Chia Kung. The latter differs from the former not only in size but also in quality. It is thicker and commands a higher price. Hsuan paper is one of the best varieties of Chinese paper. Its chief use is for art work. The scrolls and paintings that adorn the walls of Chinese households are done on Hsuan paper.

Paper made from bamboo pulp is usually of inferior quality. There are quite a number of varieties, the most common being Pai

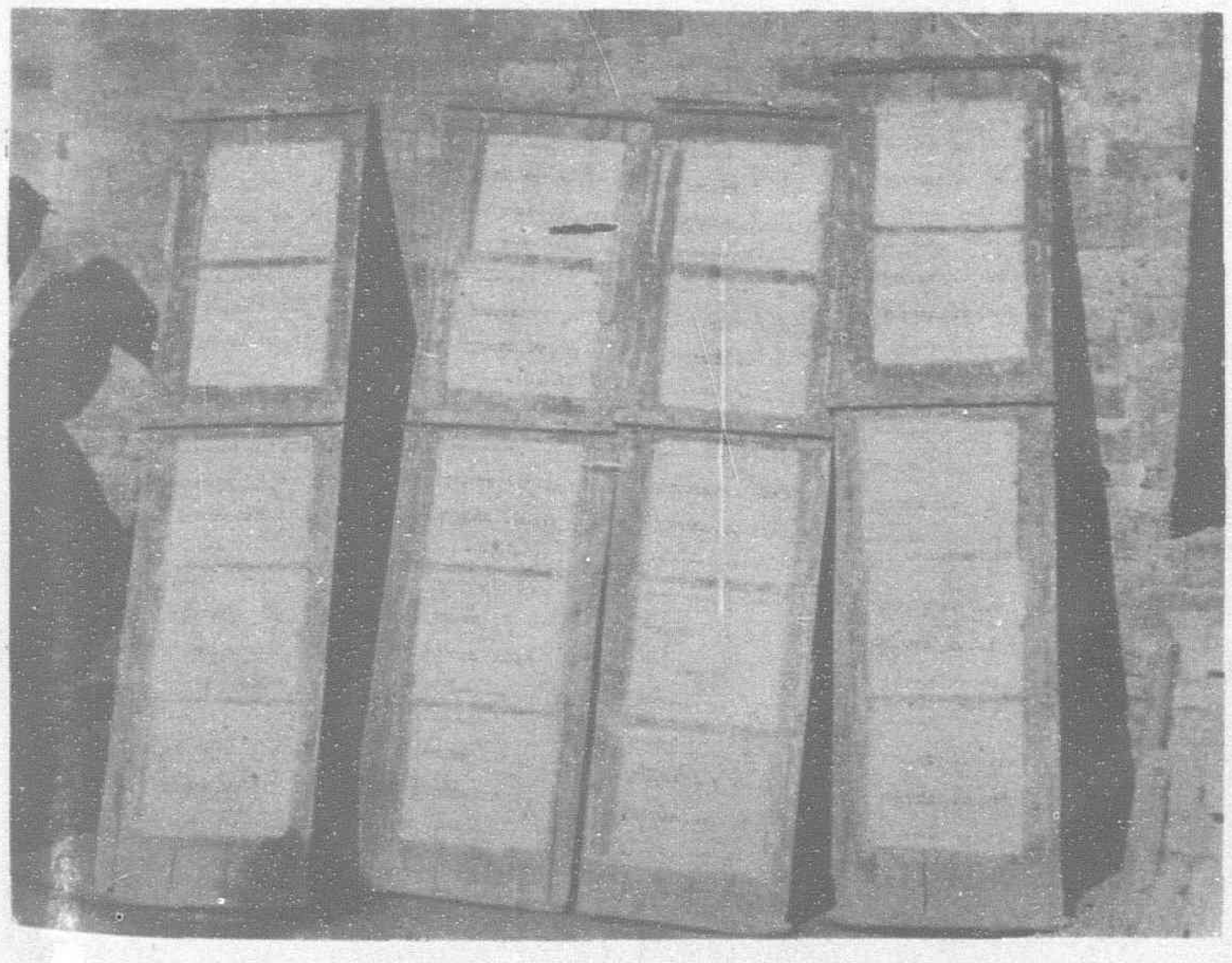
Kwan and Piao Sin. Pai Kwan paper is used for ordinary stationery and for book printing and Piao Sin for wrappers, fire brands and other uses. In making paper the bamboo must be cut before it grows too old. Bamboo shoots start to grow in April, and the young bamboo must be cut at the beginning of June. Bamboo after a year's growth is useless for making paper because its fibres are no longer tender enough to be reduced to paper-making pulp. When young bamboo is cut and pruned of its branches, it is tied in a bundle and placed in a pond to be steeped in water for about two weeks until the bark or the green covering is removed by maceration. The macerated bamboo stalks are then taken out of the pond and cut into chips, each about the length of its natural joints. The chips are carefully sorted and graded. From a single stalk the chips are divided into five classes. The part nearest the root and that at the top are not suitable for making any sort of paper but the lowest grade because the "fibres" are either too coarse or too flimsy. The chips obtained from the middle of the stalk are the best, being used for making high-grade paper. When the chips are sorted and graded, they are treated with lime and water for five or six days in a pond. They are then boiled in an iron boiler for two to seven days. The water in the boiler is then drained off and by further beating and pounding the contents are reduced to fibres, which are then washed several times until they become perfectly clean. By the action of soda and wood ash placed in the boiler together with the cleaned fibres for about 20 hours, the fibres are softened. Boiling is renewed for several days and further washing of the fibres follows. In summer time the washing takes about ten days; in winter forty days are required to clean the fibres of soda or wood ash. The fibres, now sufficiently softened, are placed in a well-ventilated room to dry. The process of reducing the fibres to pulp and making and drying the paper is practically the same as that described above with regard to the treatment of bark or straw in making Hsuan paper. When the sheets come out of the drying chamber, they are bleached with sulphur and rolled with a stone roller to make their surface smooth and glossy. They are then ready for the market.

The coloring of the paper does not belong to the province of the manufacturer; it is done by the paper dealers. By custom colored paper is more in demand then plain paper in China, each kind of colored paper having a particular use. Red paper, for instance, is taken to signify "happiness" and is therefore used on all occasions except in mourning when blue or green paper is used instead. Yellow paper signifies authority and was formerly used for writing official proclamations and also in connection with religious observances. Colored paper is generally of very inferior grade. The coloring is done by the dealer after it has arrived on the market.

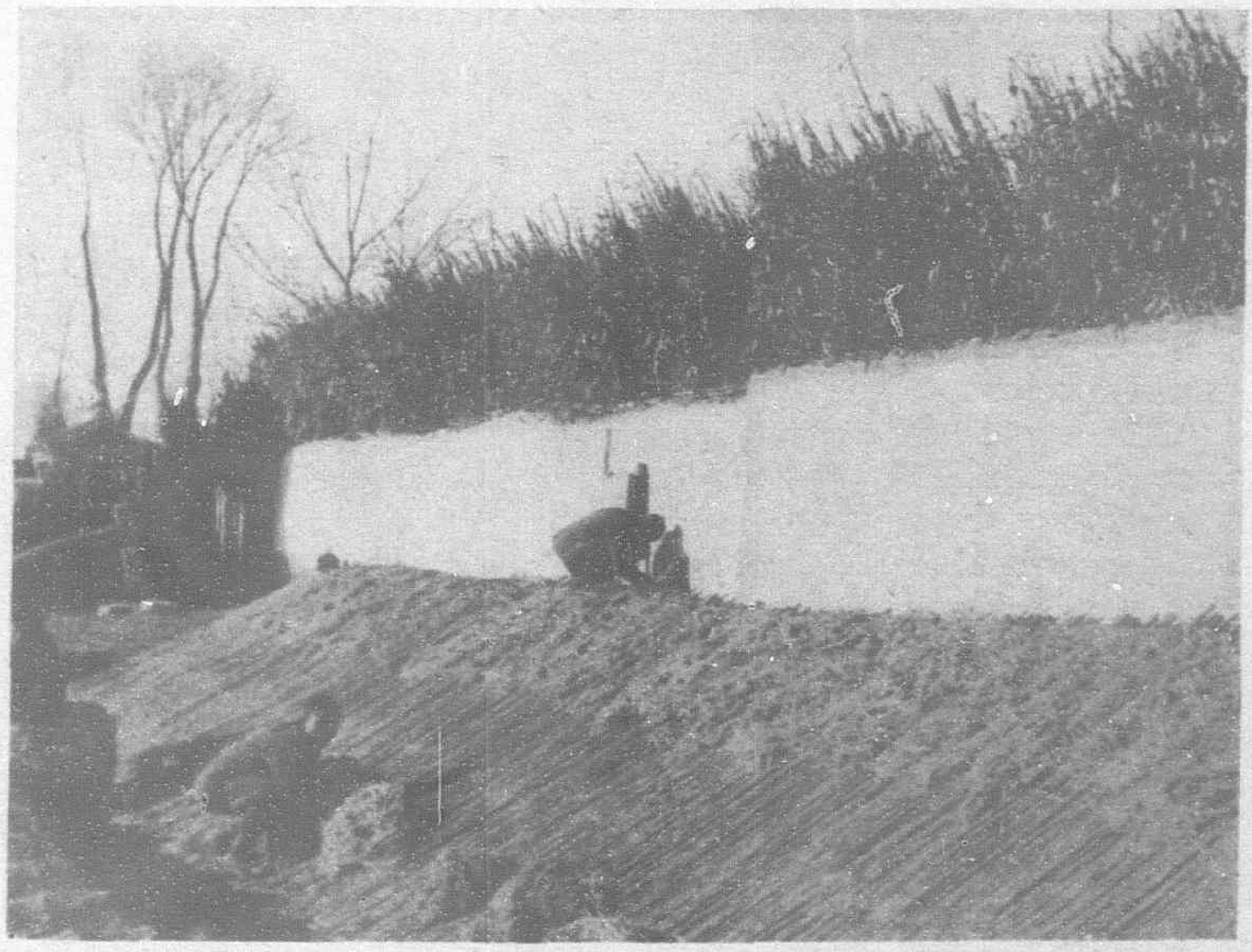
Numerous varieties of paper are produced by the different provinces. In Kiakiang, the best-known paper manufacturing centre in Szechuan province, no fewer than 17 varieties are produced, each having certain uses. All of them are made from bamboo fibre. The following table shows the name, market price and other particulars of each variety of paper produced at Kiakiang:

Name	Market Price	Place of Consumption	Remarks
Kung Chwan	$0.40-$0.90 per "Ma" of 360 sheets	Chungking, Chengtu, Kiating and Yunnan province.	
Teh Fang	$16-$43 per 10,000 sheets	Chungking, Chengtu, Neikiang and Fushun	Used chiefly for book printing and also as wrappers
Fang Tze	$30-$36 per 10,000 sheets	Chungking, Chengtu and Neikiang	For making books, etc.
Kwan Tze	$35-$36 per 10,000 sheets	Chungking	About 1,000,000 sheets are consumed yearly in Chungking
Chang Kung Chwan	$18-$22 per tao of 80 catties	Chengtu and Chungking	Total yearly production is about several hundred tao.
Kao Yang	$10-$20 per 10,000 sheets	Chengtu, Chungking, Luchow, etc.	Known locally at Kiakiang as Shui Tze and at Luchow, Pi Tze. Its principal use is for fans and books.
Lien Sze	$1-$1.50 per tao of 95 sheets	Chengtu, Neikiang and Fushun	This is a bleached sort, large quantities being consumed yearly
Imitation Hsuan Paper	$3 per tao of 95 sheets	Chungking and Chengtu	Made from fine bamboo fibres bleached. Twice as thick as the Teh Fang paper.
Hsu Pai Tsein	$50-$120 per tao of 95 sheets	Chengtu	Used exclusively for art works such as paintings and scrolls. There are three varieties. The 5-feet variety is sold at $50 per tao, the 6-feet variety, $70 and the 8-feet variety, $120.
Pao Tze	$20-$30 per 10,000 sheets	Chengtu	Used chiefly as news print for the vernacular papers. The bleached variety commands a higher price.
Kiung Tze	$4 per tao	Luhsien	Very coarse but extensively used at religious and funeral services.
Pai Er Lien	$10-$12 per 10,000 sheets	Chengtu	Used chiefly as wrappers.
Lao Lien	$14-$15 per 10,000 sheets	Chengtu and Luhsien	Used chiefly as wrappers.
Chwan Lien	$17-$18 per 10,000 sheets	Chengtu, Luhsien, Kiating and Yunnan province	Finer variety is used as writing paper and coarser variety burned at funeral and religious services.
Chang Lien	$10-$15 per 10,000 sheets	Chengtu	For book printing.
Tu Lien	$5-$7 per 10,000 sheets	Chengtu and Luhsien	Used chiefly as wrappers and also for making books.
Ching Chang	$10-$16 per 10,000 sheets	Chengtu, Kienwei and Suchow	For book printing.

The prices in the foregoing table are given according to the market quotations prevailing in Szechuan in July, 1924. Paper making in Szechuan is by no means standardised. The same sort of paper made at different places or at different times may differ greatly in quality or size, hence its price varies accordingly. The



Drying Paper Scrolls



Pulp Soaked and Dried Above the Finished Product Spread on Prepared Mud Walls names given above are local names. They may be known under other names in another province.

The cost of different kinds of raw materials for paper manufacturing may be shown as follows :

	Raw Material	Cost	Remarks
Bamboo Fibre	Pai Kia Tso Ma (Fresh)	$7-$9 per picul	
	Chin Tso Ma (Fresh)	$5-$6 per picul	This together with Pai Kia Tso Ma is bamboo fibre of the best kind. Used in making such paper as Chwan Kung, Chwan Lien and Teh Fang.
	Shui Tso Ma (Dried)	$11 per picul	Inferior grade.
	Chai Tso Ma (Dried)	$9 per picul	Used chiefly in making paper of the coarser variety.
	Pan Tso Ma (Fresh)	$3 per picul	
	Lun Tso Ma (Dried)	$1-$1.50 per picul	This is the lowest grade of fibre, used only for making paper of the coarsest variety.
Soda	Imported Soda	$13 per bag of 160 catties	
	Native Soda	$10 per picul	Produced by certain Chinese soda factories at Pengshan and Loshan, Szechuan province.
	"Tsao" Soda	$7 per picul	A kind of native soda produced at Tienchuan and Omei, Szechuan province. This is of inferior grade. Requires 300 catties to treat 10,000 catties of bamboo fibres.
	"Tsai" Soda	$15-$16 per picul	Produced at Paohsien, Szechuan province. Requies 180 catties of this sort of soda to treat 10,000 catties of bamboo fibres.
	Lime	$0.60-$0.70 per picul	Produced at Loshan and Omei, 3,000 catties are required to treat 10,000 catties of bamboo fibres.
	Fuel	No fixed price	About 2,000 catties are required to boil 10,000 catties of bamboo fibres.
	Bleaching Powder	$40 per chest of 80 catties	Imported from Japan. About two catties are used for every 100 catties of paper pulp.
	Soap Tree Leaves	10 cash (less than half a cent) per catty.	The juice is used to add cohesion to the pulp

The following table shows the main equipment of a Chinese paper mill in Szechuan :—

Article	Use	Value
Two Stone-lined ponds	For washing and steeping bamboo fibres	$30 each
One iron boiler	For boiling bamboo fibres	$20
One stone mortar or a specially prepared stone slab	For pounding bamboo fibres	$7
One stone tank	For storing raw materials	$10
Bamboo screens	For straining and drying the pulpy mass	...
Earthenware jars	For storing the chemicals used in paper making	$1 each

There are numerous accessories not included in the foregoing list. What forms the important part of a Chinese paper manufacturing plant is the drying chamber with its thick, hollowed wall to which reference has already been made.

The wages of Szechuan paper mill hands vary from $1.20 to $3 a month with food, which consists of hardly anything more than maize flour cakes. In the paper mills women are also employed. The paper mill owners are by no means capitalists. Their financial condition is only a little better than the hands they employ. In the paper mills master and men often work side by side and the occupation is by no means a pleasant diversion. In washing the bamboo fibres, their hands are swollen and sometimes seriously hurt by the action of the soda and lime water.

The profits from paper manufacturing may be handsome, but it is not the paper manufacturer but the paper dealer or exporter who gets the lion's share. The manufacturer is always too poor to raise capital in any other way than to obtain loans from the paper exporter, who comes to a paper mill with an offer of an advance payment for so much paper to be delivered on a certain date at a low price. The manufacturer is always eager to accept the advance payment, which he at once utilizes as capital to start operations. When the paper is ready, the exporter pays the balance and ships the cargo to other places to be sold either by wholesale or in retail at a high profit. The working capacity of each paper mill is estimated by the size or number of boilers it possesses. A big mill can boil 10,000 catties of bamboo fibre at one time, a smaller mill, 3,000 catties. Paper manufacturers and their employees in Szechuan are raised in the mountainous districts, and can stand hard work and are able to subsist on very coarse food.

With the exception of Szechuan paper, which has been described, the best-known varieties produced in each of the other paper-producing provinces are as follows :—Kiangsi : Mao Pien, Lien Shih, Pai Kwan and Piao Sin ; Anhwei : Hsuan paper ; Fukien : Lao Kia ; Kwangtung : Lu Ti ; Chekiang : Liu Tsien Yuan.

Russo-Japanese Corporation to Exploit Siberian Forests

JAPAN is losing no time in taking advantage of the business opportunities created by the new treaty with Russia. Hardly had the ink dried on the signatures when a corporation, backed by the most powerful interests in Japan, was organized to exploit the lumber resources of Siberia. Registered under the name of The Russian Territory Forestry Society the new enterprise headed by Mr. C. Kadono, vice-president of Okura & Company, has as its principal incorporators, the Mitsui Bussan Kaisha, Mitsubishi Trading Company, Okura & Company, Suzuki & Company, the Fuji and the Oji Paper Mills, the Akita Lumber Company, Karafuto Industrial Corporation, Maritime Province Lumber Company, Russian Forestry Union, Far East Forestry Lumber Development Company and the Toyo Development Company. The new combination will enter Siberia with a capital and organization that will enable it to take its place as the strongest factor in the Far Eastern lumber trade and furnish sufficient wood pulp and lumber for Japanese paper mills and reconstruction purposes to free Japan from the major part of her importations from America and Canada.

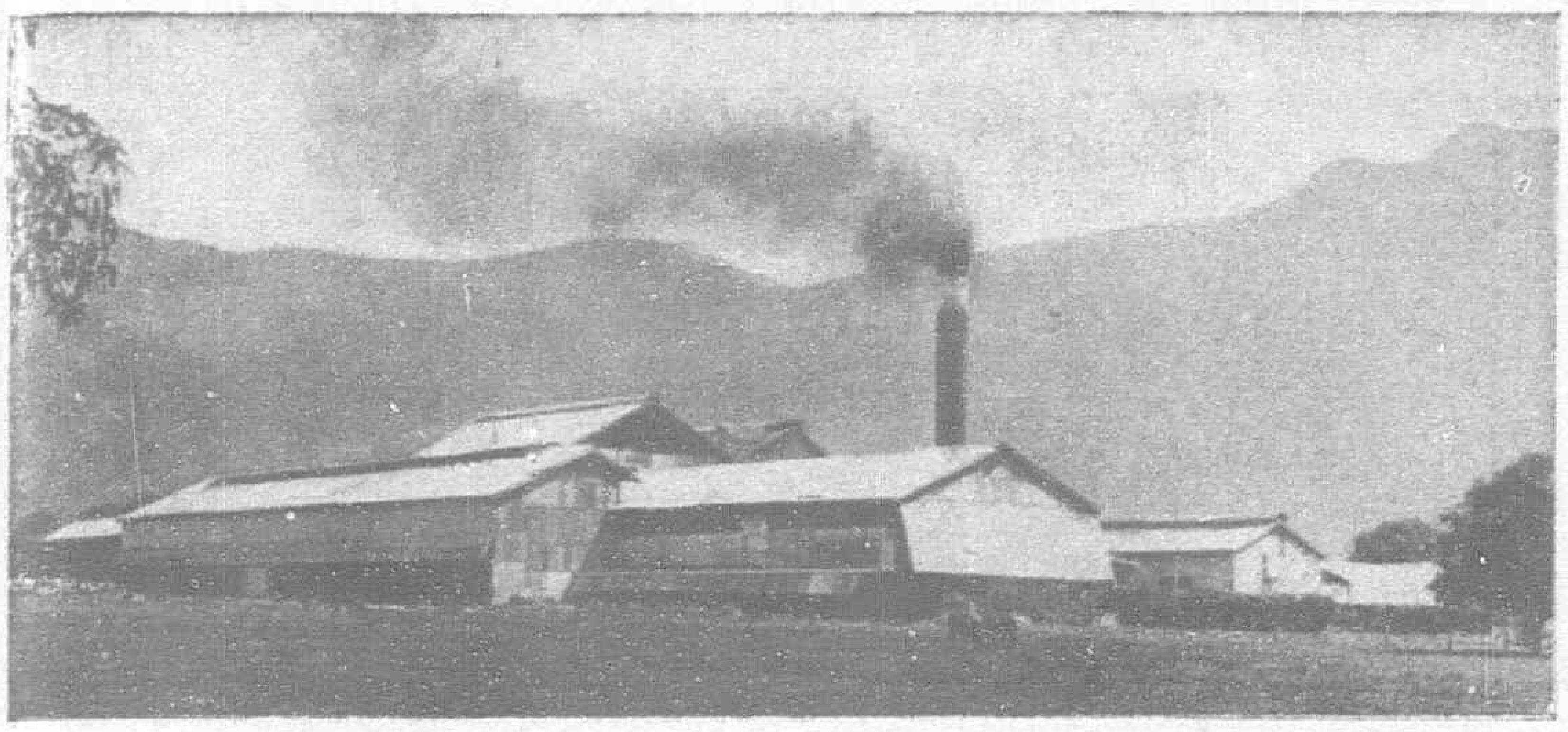
The far-reaching effect of the new agreement on the economic future of Japan may be guaged in part by the liberty of action it gives to Japanese interests in promoting new enterprises in Mongolia, in which territory Russia has hitherto enjoyed a monopoly of exploitation. One important outcome will be the establishment of sheep raising on a large scale in Eastern Mongolia under the direction of Okura & Company in an attempt to free China and Japan from dependence on foreign importations of wool. Needless to say that the same industry will also include the supply of mutton and beef for Far Eastern consumption.

Reconstruction of Nizam's Guaranteed State Railways

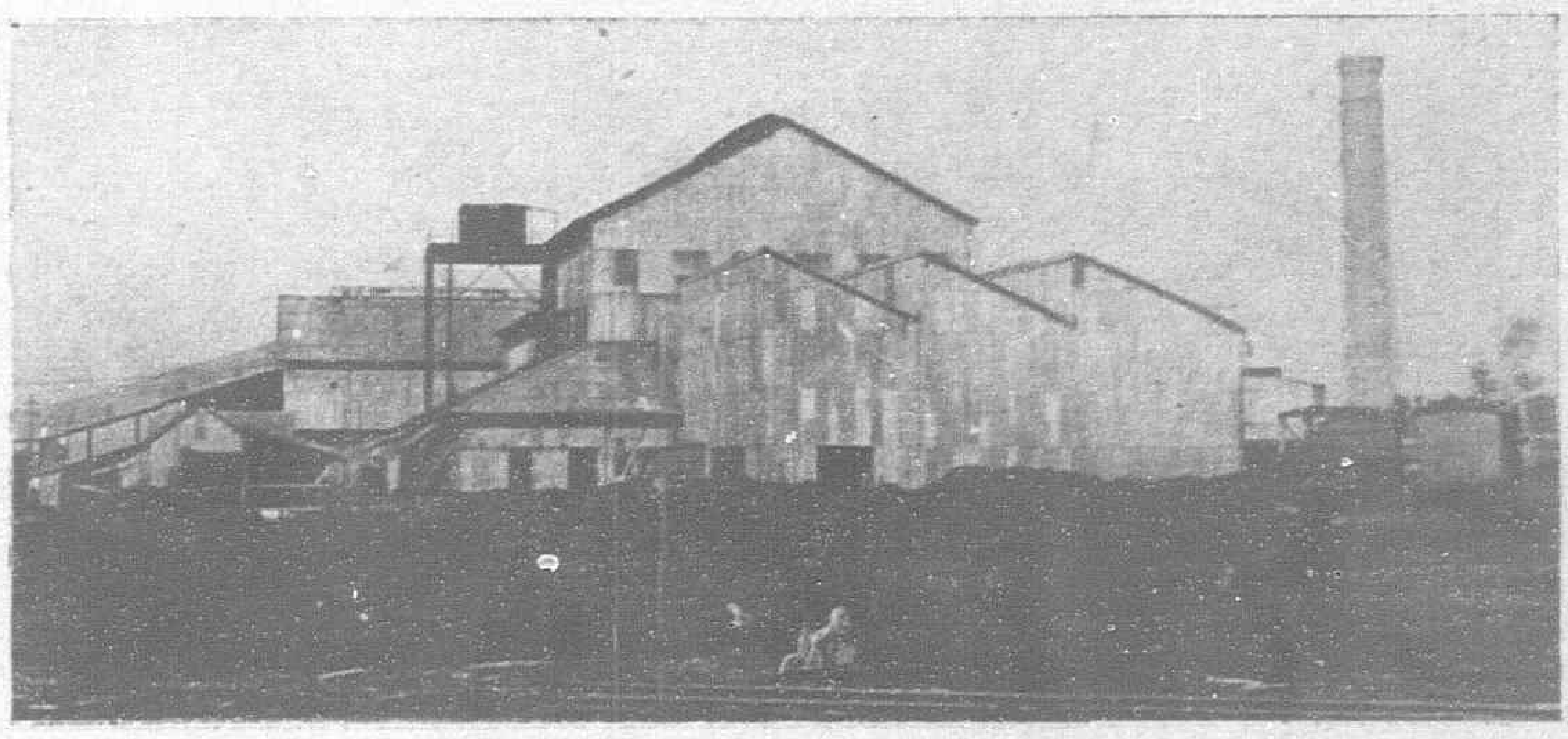
The reconstruction of, and considerable additions and extensions, to, the Nizam's guaranteed state railways is to be put in hand almost at once. Sir Seymour Tritton, the well-known Westminster consulting engineer, is proceeding to India shortly, and will report on a general scheme. The erection and equipment of the new loco and wagon shops, erecting shops, and repair works will mean the placing of very valuable contracts with engineering firms.

New Automatic Coaling and Sanding Plant

An innovation is now being tested out on the London and North Eastern Railway Company, in the shape of an electrically operated automatic coaling and sanding plant for their locomotives at Doncaster at a cost of £30,000. The installation of the new plant is being watched with considerable interest by various Far Eastern concerns. The adoption of the plant will enable coaling and sanding of engines to be performed much more rapidly and at a considerably reduced cost, and will increase the time during which the locomotives will be available for traffic purposes. Coal and sand will be supplied simultaneously.



Hambledon Mill of Colonial Sugar Company near Cairns, Queensland



Babinda Mill, Built by Government, now Operated by Growers

The Sugar Industry of Queensland

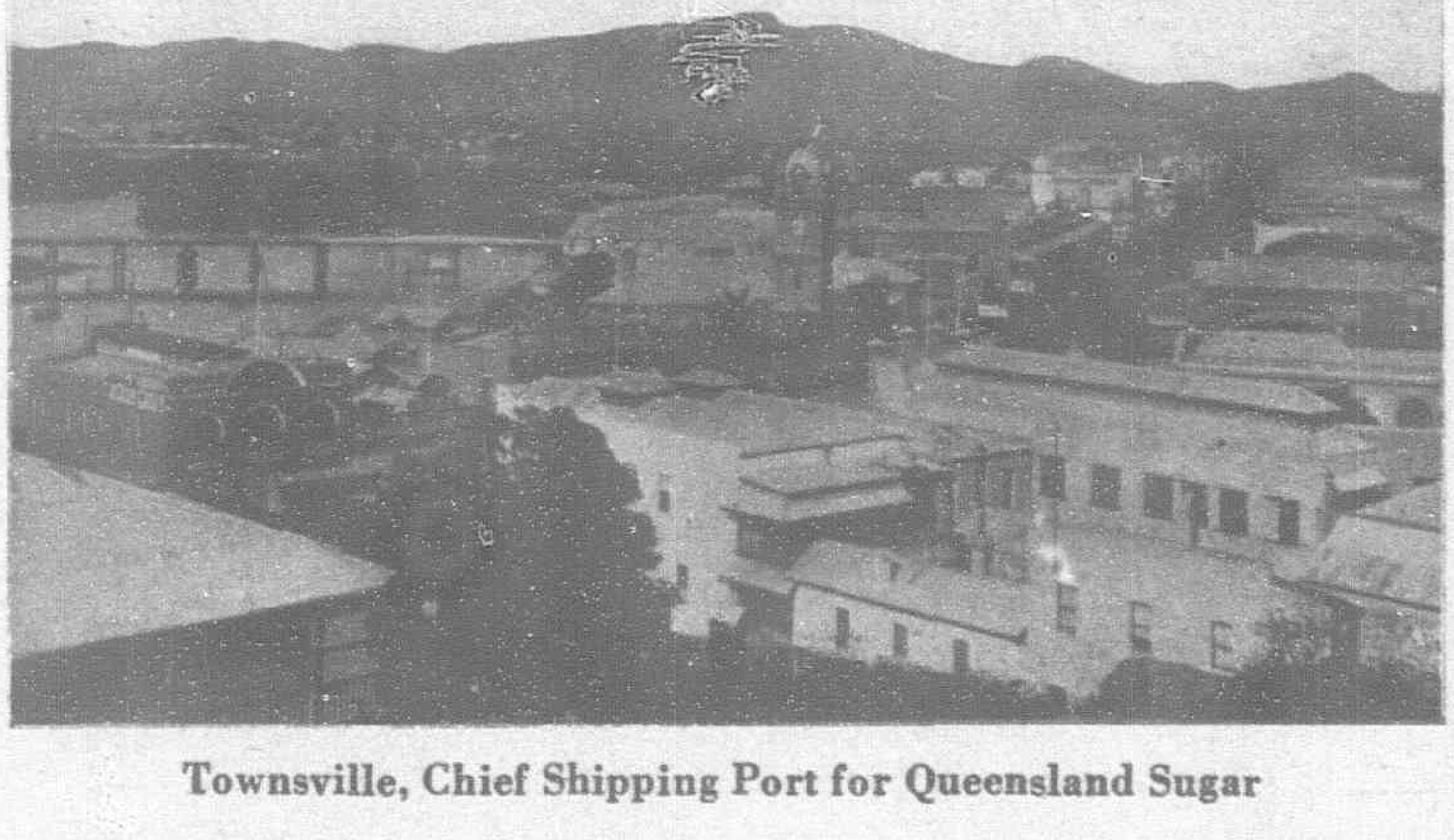
Italian Labor Solves Problem of Growers

RANKING next to wool, wheat, and dairying, the rich and prosperous sugar industry of the state of Queensland, is one of the most important commercial assets, a basic primary interest of the commonwealth of Australia, and more than that, it is the main fundamental supporting the ideal of a " White Australia." The sugar lands of Queensland are capable of producing all the sugar needed by British empire countries. This fact, with its tremendous possibilities has recently been brought home to Australians, that England last year paid America no less than £40,000,000, sterling for sugar and strenuous efforts are now being made for a preference within the empire for Queensland sugar.

Queensland with the forest soils of the south country, and those of the jungle lands of the north, combined with the perfect, all-year-round climatic conditions, assures complete and seasonable cultivation with regular, abundant, and profitable annual harvests.

In the year 1849, sugar was first grown in a small plantation on the bank of the Brisbane river, now " New Farm," one of the most picturesque suburban areas of the fine city of Brisbane, the capital of the state of Queensland. Twenty-five years later, the particularly rich lands of North Queensland were discovered, and quickly settled. This area has since come to be known as one of the richest and most extensive sugar centers of the world. With the begining of the sugar industry in the north and the remarkable rush of settlers that followed, the first substantial effort was begun for the assurance of the national ideal of a " White Australia." This did not definitely nature until the year 1904, when black labor, recruited from the South Pacific Islands, was forbidden by popular demand, and the deportation ordered of all colored workers.

Hot as is the summer of North Queensland, it has been completely proved white labor is capable of all classes of work, even that of the heaviest field operations. To promote, attract, assure and encourage white labor, Australian law demands the highest wages, not less than 20 shillings a day of eight hours, and the most comfortable living and housing conditions. The history of the change from black to white labor conditions is interesting. Having proved the fitness of white labor, and after fighting strenuously for the realization of the ideal of a " White Austraia," white labor by its Unionilsm has for years, consistently and constantly, ruthlessly hampered the progress and prosperity of this wonderful industry. Obsessed with the idea of the " nationalization " of the industry, and in the face of the terrible failures of all Australian national industries in all states, unionism obstinately set itself against private ownership and enterprise, with an unexpected and extraordinary result.



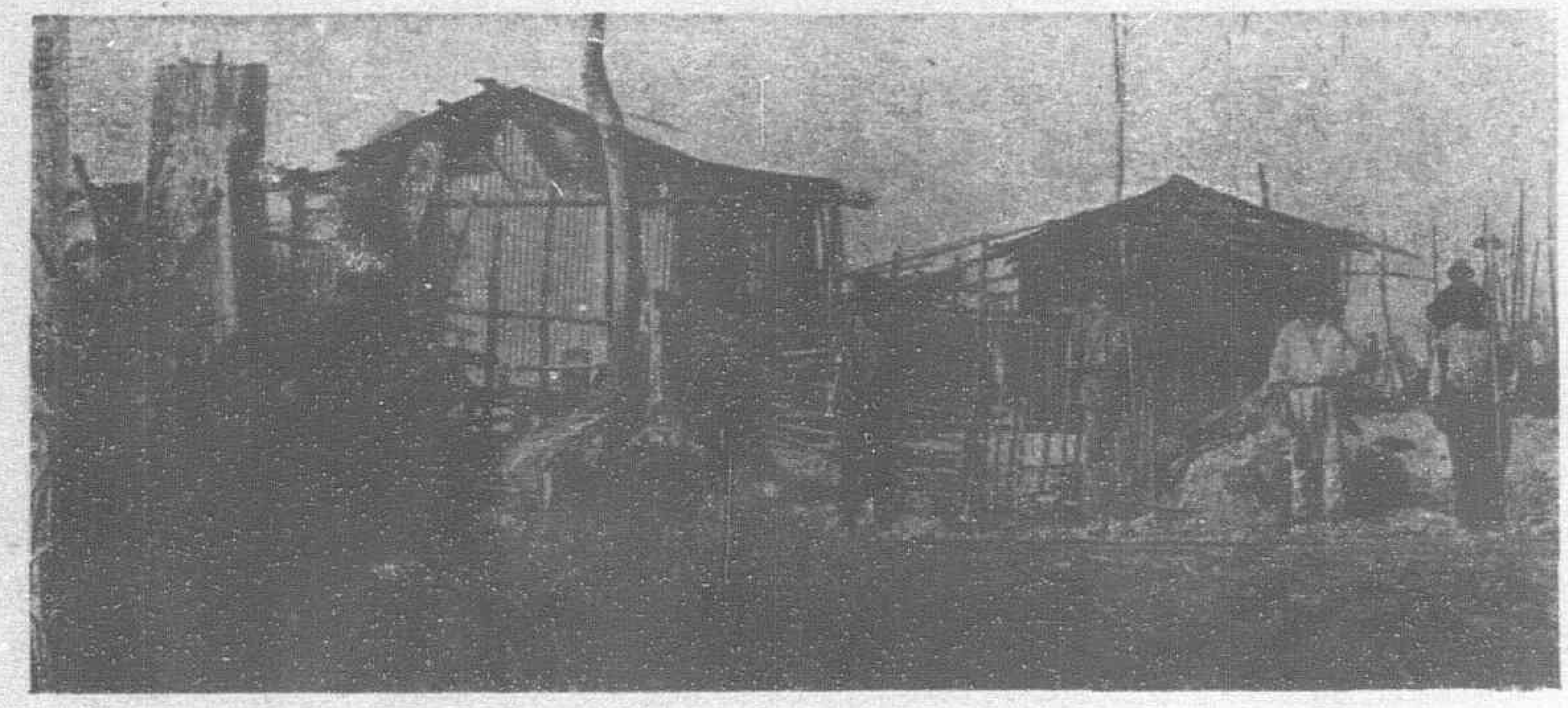
Townsville, Chief Shipping Port for Queensland Sugar

The industry has been flooded with Italian labor, little interested in Australian union ideals, and by hard work, coupled with consistent and reliable conduct, is steadily supplanting not only Australian labor but Australian ownership to a considerable extent. An agitation has now begun questioning the presence of the Italians, who are beginning to be regarded as an intrusion upon the ideal of a " White Australia," which, it is asserted, means solely " British " Australia. The difficulty is not easily surmounted, the dismissal of the Italians cannot be considered owing to the danger of international complications, as well as in the very pronounced fact, that the continuance of the Queensland sugar industry in a great measure relies upon the efforts of the Italians. Forming great companies or communities they have come to be possessed of large areas of the richest sugar lands, and Italian labor is popular with Australian growers. It is not given to strikes, nor to unreasonable demands wages for above award rates or for superior living conditions, demands which, on the part of Australian labor, incessant and irritating, have no finality and have endangered the prosperity of the sugar industry.

The Australian government to help the sugar growers, and, if possible, to satisfy Australian labor, adequately protected the industry, and until this year liberally subsidized every ton of raw sugar produced. This was to assure high wages, and comfortable living conditions, and stabilize on the soundest the industry on sound foundations. Australian labor still strikes, while the Italian hold becomes firmer. In a few years it is possible that Australian labor will be forced out of the sugar industry of the North, unable, as it is even now to take any concerted action to hold up the industry or any considerable period. Three years ago for every Italian cane cutting gang, there was at least three Australian ones---the numbers are reversed to-day.

Hope for better and saner conditions in the future are at the moment apparent in a section of Australian labor. The " Moderates," as they are called are beginning to recognize the loss of strength to unionism the continued increase of the Italians, the unemployment of Australian labor, the reduction of Australian settlement, and therefore the probable failure of the " White Australia " ideal. There are some 7,000 sugar growers in Queensland and while the Italian aspect is objectionable to many people, it is undoubtedly a factor guaranteeing the prosperity of the industry without interruption. At the same time Australian growers are a particularly sturdy lot and by their numbers seek to control the industry, and keep it Australian.

The value of the Queensland sugar industry is estimated at about £25,000,000 sterling, with a working capital of many

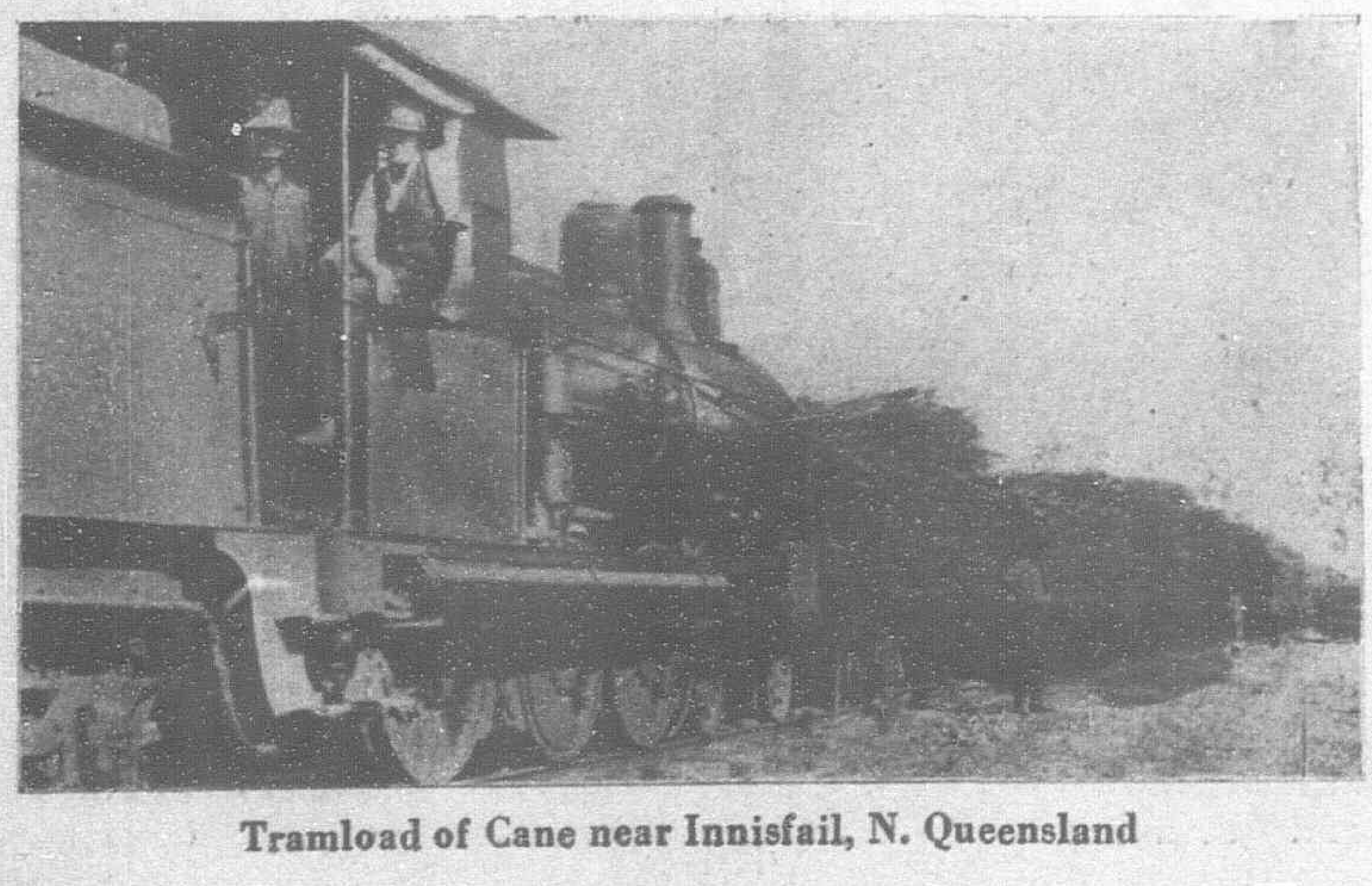

Rude Huts of Laborers who Buy Plantations from their Savings

Gang of Italian Cane Cutters in Queensland Sugar Field

millions, and producing wealth equal to £2,000,000 a month. The industry employs directly 50,000 men and the annual wage is near £10,000,000. The national revenues benefit to a considerable extent by the wealth of the industry, more so of late that it can carry on without the government subsidy, which by general agreement has been removed. The Queensland sugar industry has materially assisted the settlement of the state, especially the tropic North. It is responsible for some of the busiest and most progressive cities of the state, Townsville, Cairns, Mackay and Bundaberg, for many large towns, Innisfail, known as the "Million pound" town, Ingham, Babinda, Ayr, Childers, and Nambour, Forest and jungle lands are being cleared annually to the extent of tens of thousands of acres. Railways are spreading out to top several thousands of miles, a notable enterprise of recent date being the linking up of the railways from Cairns in the extreme North of Queensland, to Perth the capital of West Australia, a journey of 4,000 miles, one of the longest in the world.

Trucking Cane to the Main Railway Line

In every sugar district there are several hundreds of miles of tramways, permanent and portable, and the quantity of rolling stock, locomotives, trucks and passenger coaches must be numbered by the thousands. Engaged in the sugar trade is a fleet of vessels from steamers of 10,000 tons to small motor launches, with an immense number of barges, and molasses, tank punts, doing service from up river mills to the loading anchorages at sea. Millions of pounds have been, and are being, spent in wharves and storing sheds in all the bigger ports such as Cairns, Townsville, and Brisbane. Great engineering works have been opened in all the Australian capitals, the sugar industry keeping these fully engaged. Refineries of most modern equipment famed for size and completeness are also operated in the eastern districts. At least 200,000 people are directly and indirectly concerned in this great sugar industry of Australia. The first ton of sugar was produced in Queensland in the year 1862, and with the aid of the simple domestic wash-boiler. In 1867 the tonnage was 168 tons, in 1880 it jumped to 15,681 tons. This season (1924) it will amount to 300,000 tons.


Tramload of Cane near Innisfail, N. Queensland

In 1901 there were 60 mills in Queensland, all of the most primitive type. To-day there are exactly the same number of mills all of which cost from half to three-quarters of a million sterling. Generally the capacity is over 500,000 tons.

Mills are both government and private owned. Government ownership is naturally not popular, it has to be admitted it has served a very useful and convenient purpose. The government is ever ready to erect mills in new and promising districts, at once relieving the growers of the burden of cost, and giving them a splendid chance of utilizing their earliest crops, thus bringing in returns to encourage and to help them to carry on. Every supplier in the district of a mill pays a fixed amount for the crushing and milling of his cane, at the same time a certain sum is held back to refund with interest the cost of the mill. When the money advanced by the government is refunded and if the growers are willing to take over the management of the mill, the government hands it over, maintaining only a slight supervision to see that the enterprise is carried on wisely and to the satisfaction of the growers, who might be termed a co-operative concern.

The Queensland sugar industry is admitted by experts to be as complete and perfect as any industry in the world. Every department, scientific, commercial, management and cultivation is as up-to-date as well paid brains and energy can make it. Both the federal or commonwealth and state or Queensland governments are keenly alive to its importance, and especially interested in its general progress. The governments maintain departments devoted to the interests of the industry. In experimental stations scattered over Queensland, experts are constantly engaged in investigating every phase likely to lead to its general advancement. Remarkably free from pests and diseases, the result of constant and vigilant inspection, cultivation is most successful. The classing of soils and canes suitable for various types of soil, the experimenting in canes for profitable density, frost resisting, and fullness of suger qualities are matters continually employing large and experienced staffs. Badila, or New Guinea cane, is the kind in general use but every year some new variety is found suitable for certain areas, having certain qualities assuring its cultivation on a profitable basis. Sugar seasons in Queensland vary from very good to fair, never indifferent to bad, and this has assured numerous subsidiary industries, such as jam and fruit preserving, confectionary and biscuit making for which Australia is now a leader. Australians pay 5 pence to 6 pence a pound for sugar, the highest rate in the commercial world, but they do so gladly, believing that high wages and high standards of living conditions for all concerned in the industry, is necessary for the growth of the commonwealth.

Distribution of Petroleum in Burma

By George P. Chaplin, M.Inst.M.M.

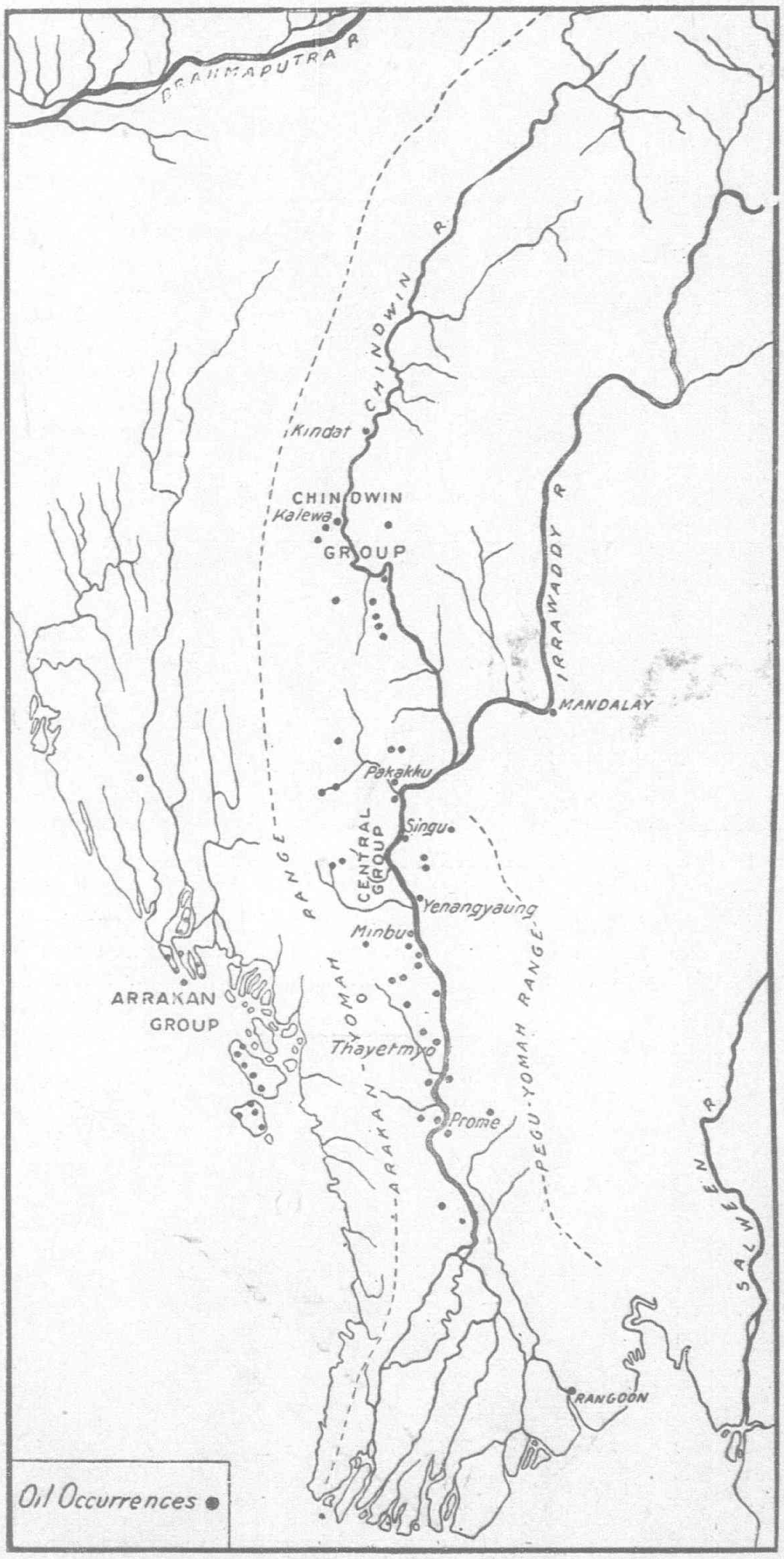
HAVING spent some time recently studying the subject of petroleum occurrences in Burma and the possible extension of the oil industry there, I offer the following few notes, hoping that they may be of some general interest to the non-technical readers of the *Magazine.*

The accompanying map, based on that in the "Oilfields of Burma" by Dr. E. H. Pascoe (Vol. XI, Part 1, Memoirs of the Geological Survey of India), shows the majority of the localities where petroleum indications were known in 1910, and it may be said that few further surface indications of importance have been reported since that date. It will be seen that, with the exception of those occurrences on the Arrakan coast, west of the Arrakan-Yoma Range, practically all the others are along a line extending up the Irrawaddy valley from Prome to slightly north of Pakokku, and thence, with a distinct break, along the valley of the Chindwin to Kalewa, with further isolated indications at Kindat (Upper Chindwin), which is the most northerly of the petroleum occurrences officially reported.

The distribution of the producing districts is also indicated in the analysis in the table where for easier reference the different producing oilfields have been divided geographically into four groups, the Central Upper Chindwin, Arrakan, and Thayetmayo. These figures show that the central group has produced, for the three years referred to, 99.3 per cent. of the total yield, and that of this large amount the Yenangyaung field with 63 per cent. and the Singu field with 34 per cent. have between them produced 97 per cent. When the statistics for 1923 are published it is probable that rather less production from Yenangyaung, with a corresponding increase from the Singu field, will be shown; only small differences are to be expected from the other fields and groups.

I do not want to go too deeply into the geology, but it is instructive to inspect the sketch map showing the probable approximate distribution of land and sea after the first main phase of the Himalayan uplift, that is, during early Miocene times, during which period the geological series in which petroleum is found in Burma was laid down.

All petroleum produced in Burma is admittedly found in rocks of the Pegu system, which are of Oligocene or lower Miocene age. Formerly it was thought by some geologists that the oil occurred only in the Kama clays of this system, but it is now recognized that though the different groups have not been definitely traced over the whole extent of their exposures, oil may occur at any horizon in the system.

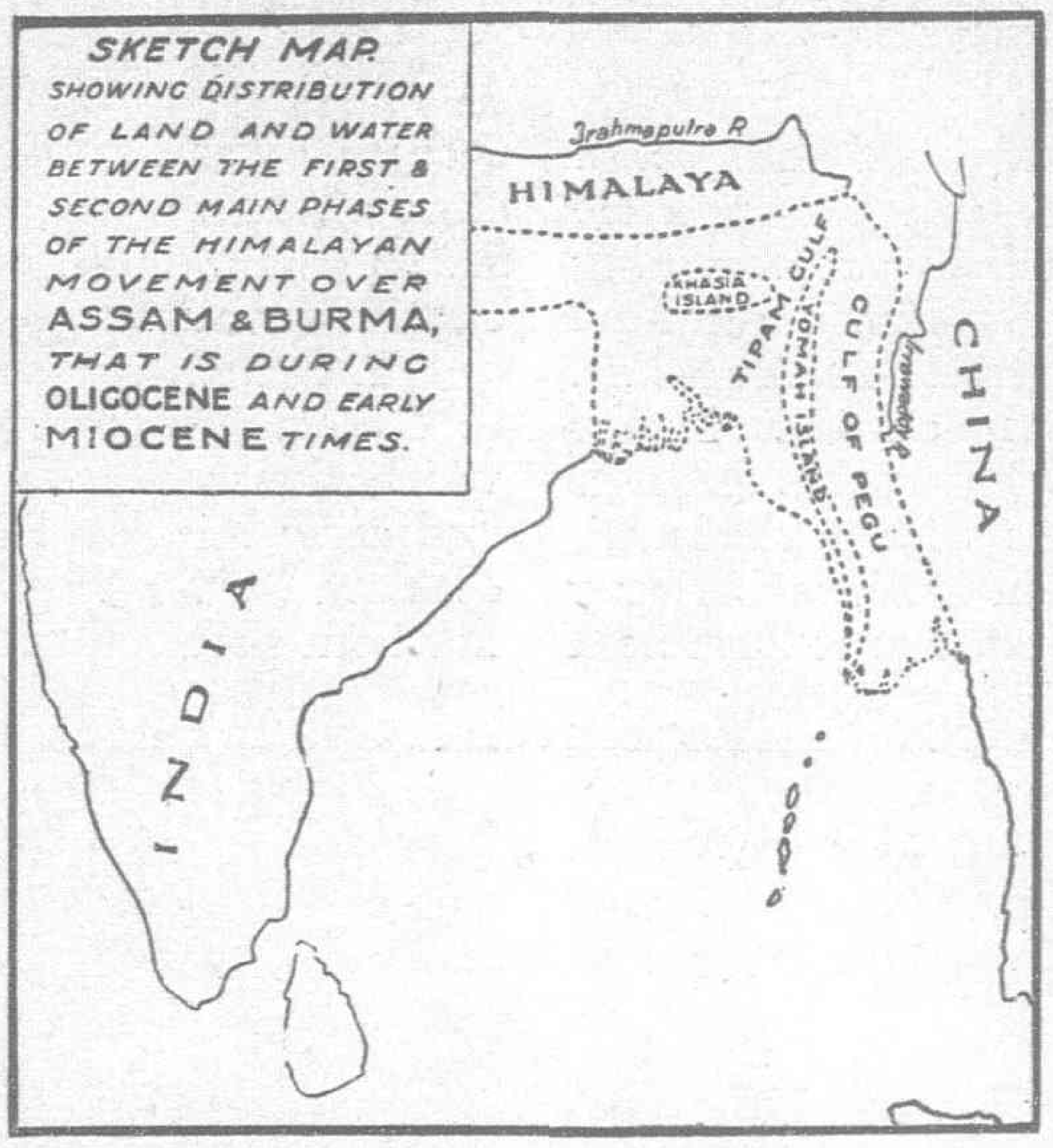


Sketch Map of Burma Showing Oil Occurrences

The extent of the Pegu system in Burma roughly corresponds to the area embraced by the Gulf of Pegu on the sketch map, which shows the distribution of land and water during Oligocene and early Miocene times, though the southern portion is entirely overlain by the later Irrawaddian series, and also in part of the northern portion of this old gulf the Pegu rocks have been eroded, leaving Eocene and older systems exposed.

With regard to the fields of the Upper Chindwin and the central groups, it is believed that these occupied areas in which lakes, lagoons, or deeper portions were still in existence when the rest of the gulf was either more or less dry land, or else covered by shallow water only, earth movements subsequent to burial and consolidation of the strata having formed the anticlinal structure in which the oil is found. Axes of anticlines throughout the Pegu system have a general north and south strike, which is mostly slightly west of north and east of south. It has been pointed out by Cunningham Craig that there are evidences of other earlier-formed flexures approximately at right angles to those mentioned above, but it does not seem that the earlier movements had any recognizable effect on the oil concentration.

Much has been written about the Yenangyaung field which, to date, has supplied well over 75 per cent. of the recorded total of Burma's production. It is not known definitely when oil was first extracted there, but it is known that prior to 1800 there was an annual yield of more than 500,000 barrels produced by the Burmese from over 500 wells, and that by far the greater number of these were at Yenangyuang. It is probable that the number of hand-dug wells then existing was considerably in excess of 500, as a settled average of 1.5 barrels per day per hand-dug well may be considered as being on the high side. After the British occupation and annexation, the rights of the Burmese owners of hand-dug wells and potential oil-bearing ground were naturally respected, but the native owners (called Twinzas) among themselves only held small patches in certain areas reserved for them. When it became necessary to legislate for the opening up of these areas by modern methods, the unit decided upon was that of a circle with 30-ft. radius. This possibly appeared to be a compromise, which would meet most of the conditions existing as far as local conditions and knowledge then went. The result has been that Yenangyaung has been a very expensive field to work, and the different companies were obliged, in self-protection, to drill competitively against their neighbors. Probably, in the Twingon and Beme reserves 60 per cent. of the total drilling was economically unnecessary, and its cost was as completely wasted from a national point of view as if it had been thrown into the Irrawaddy. The Twinza or Burmese owner has, however, benefited greatly, as owing to competition high prices have been realized by them for their site areas, which are only equal to 0.065 acres each.

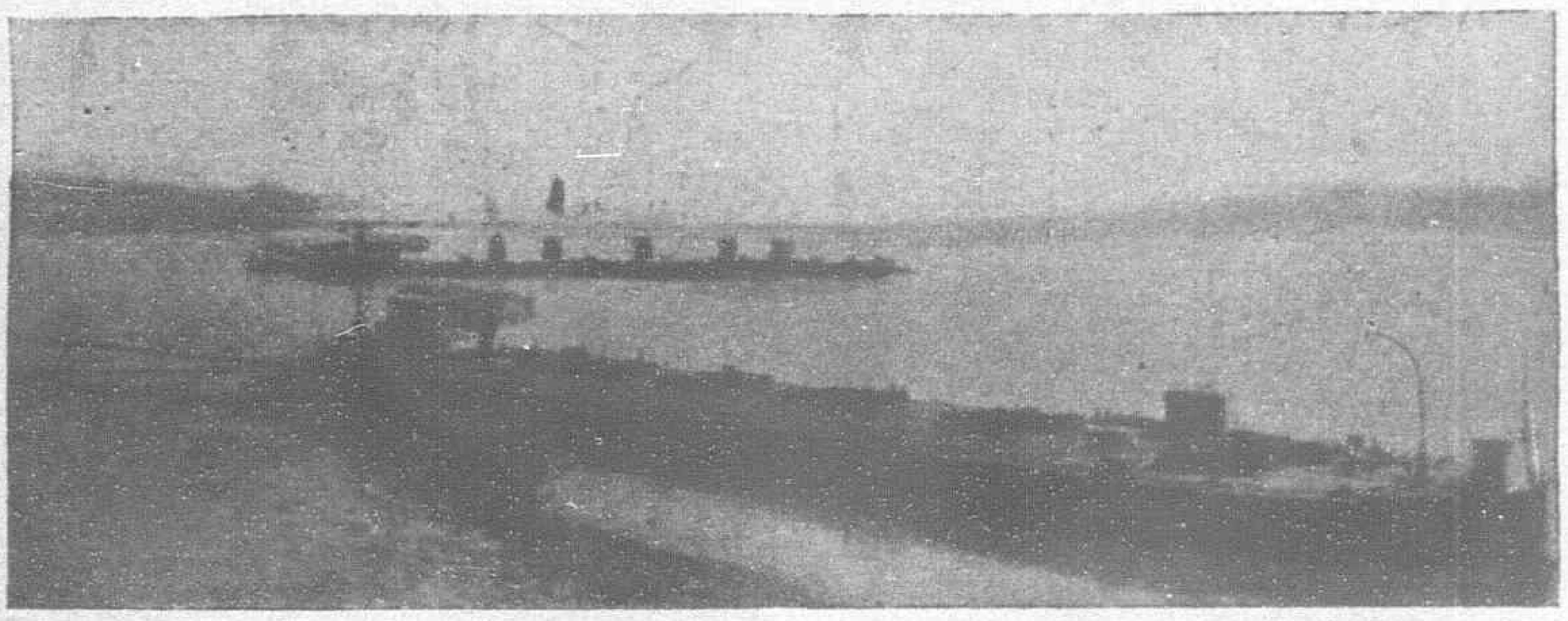

SKETCH MAP
SHOWING DISTRIBUTION OF LAND AND WATER BETWEEN THE FIRST & SECOND MAIN PHASES OF THE HIMALAYAN MOVEMENT OVER ASSAM & BURMA, THAT IS DURING OLIGOCENE AND EARLY MIOCENE TIMES.
Brahmaputra R
HIMALAYA
KHASIA ISLAND
TIPAM GULF
YOMAH ISLAND
GULF OF PEGU
Irrawaddy R
CHINA
INDIA

Burma in Oligocene and Early Miocene

It will readily be recognized under the conditions imposed by the close siting of wells that the production from the Yenangyuang field has been intensive; also that a larger percentage of the oil present in the various sands has been extracted than is the case with other fields where wells are economically spaced; and, further, that though its total yield has been larger its life will be shorter than if normal drilling programs could have been carried out by the various companies concerned.

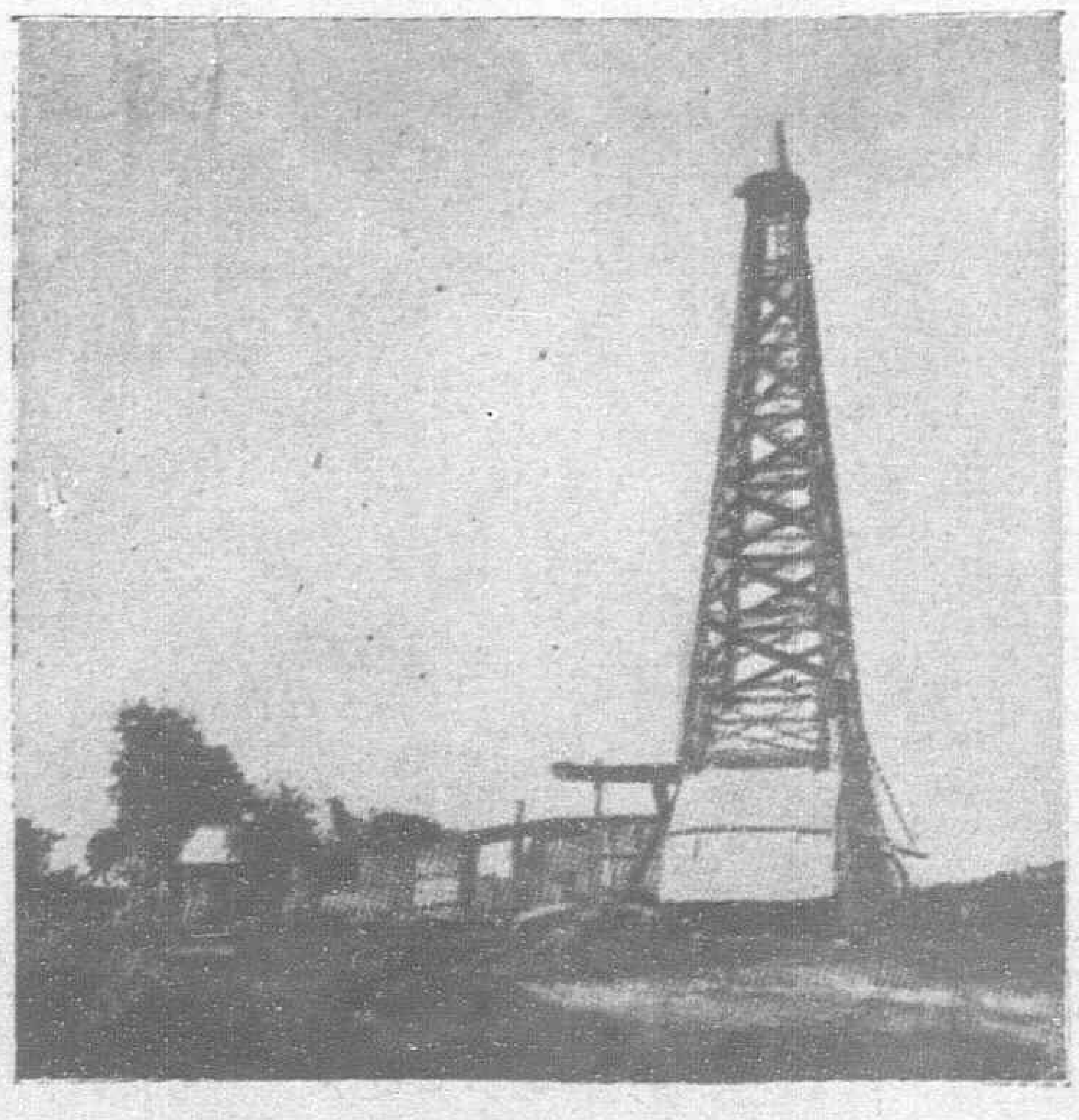
The Yenangyaung field is now regarded as passing its prime, and production from the Singu field will probably be increased so that the combined production from these two will be maintained, the latter being capable of a considerably greater sustained output.

Most of the drilling in the past has been done with standard (American) rigs, the derricks being usually 82-ft. high. Some drilling has been done, in the shallower fields, with portable drilling machines, and in a few cases rotary drilling has been carried out. Drilling is generally not easy, as the ground seldom stands up well. Also in the lower productive series concretions of cemented calcareous sandstone are not altogether infrequent, these being often responsible for a crooked hole.



Transport of Oil Down the Irrawaddy

Conditions and customs are also against speed in drilling, as it is the exception for wells to be drilled on "tour." Generally one nine-hour shift only per 24 hours is worked, and work is stopped at one o'clock on Saturday and is resumed again on the following Monday morning. A drilling crew consists of the driller and nine natives, exclusive of the boiler fireman. This seems, and is, a large crew compared to other countries, but physically the Burmese are a small race, and the average weight of the adult male will be under 9 stone.



Drilling Rig and Derrick in Burma

The average rate of drilling throughout Burma for wells drilled with standard tools, excepting shallow wells of 1,000-ft. and under, and not taking into consideration stoppages for Sundays, cementing, etc., is not more than 250-ft. per month, and is probably below this amount.

Labor is nominally cheap, but in the long run costs more than the dearer but more efficient labor of other fields where the climate is more temperate.

The Thayetmyo district has been regarded rather as the Cinderella of the oil-bearing areas, and probably less geological work has been done in it than elsewhere; it contains evidences of the presence of oil, and favorable structures are known to exits, but the question as to whether lithological conditions in these structures are also favorable has not yet been determined.

In the Arrakan area the extent of the oil-bearing rocks is not large, and it is interesting more from a geological point of view than from a commercial one. The oil seems to be contained in rocks of Eocene age. It is possible that Pegu beds of small extent only were formed at the mouths of swiftly running streams of small length, descending from the heights of the Yomah Island, but under these circumstances, unless other factors where also in operation, it is unlikely that extensive oil deposits would result.

Except for a certain amount of "topping," which is carried out on the fields themselves, all oil except that from the Arrakan group is conveyed to refineries belonging to the different companies, all of which are situated on the left-hand bank of the Rangoon estuary, opposite to and some four to ten miles below Rangoon.

All the oil produced by the Burma Oil Company from their Yenangyaung and Singu fields is passed through their pipe-line, which, from Yenangyaung to Syriam (some 275 miles) is a single line of 10-in. diameter. Most of the other companies transport their product by oilflats, which are towed down the Irrawaddy, when necessary the oil being brought to storage tanks on the banks of the river by pipelines, which in the case of fields other than Yenangyaung and Singu are generally of 4-in. diameter. The average oilflat used has a capacity of 600 tons, and can take this quantity when the river is in flood; in the dry season, however, when the river may be 40-ft. or more lower, 450 tons only is carried.

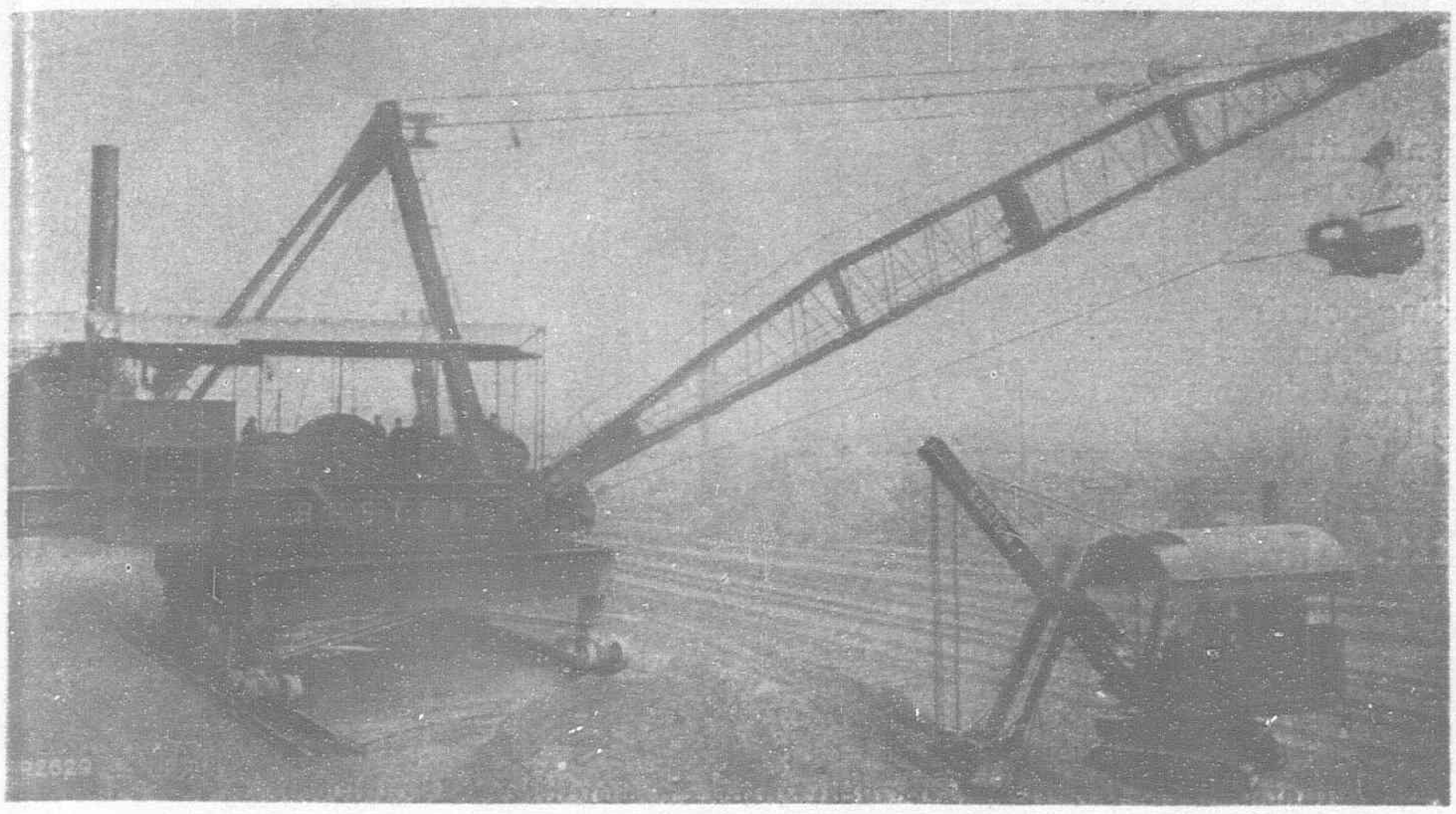
Petroleum produced in Burma has a paraffin base, and generally is a comparatively light oil. In isolated cases small veins and seams of manjak have been found, proving that mixed or asphaltic base oils have existed; these occurrences of manjak, are, however, uncommon.

The following approximate particulars of an oil produced by one field are indicative of the general characteristic contents of Burma petroleum for refinery purposes—

Specific gravity		0.870
Petrol	per cent.	18
White kerosene	„	20
Yellow kerosene	„	32
Wax	„	6
Blue oil ..	„	15
Residue and losses	„	9

The blue oil contains the lubricating fractions and part of it, according to requirements, is treated for fuel oil, batching oil (for jute), or for further kerosene, or is used for refinery fuel purposes. It will be noted that the crude oil carries a large percentage of kerosene and wax, a satisfactory petrol content, and only a small quantity, relatively, of lubricating oil fractions. In fact, it is an oil specially suitable for profitable local treatment, as all the kerosene (even the worst grades) has a ready sale in the country and in India. The petrol can mostly be disposed of

(Continued on page 98).



Ruston and Hornsby Dragline Excavator: Bucket Capacity 8 cubic yards: Jib 120 feet: Weight 280 tons. Supplied to the India Office for the Sutlej Valley Irrigation Project.

British Engineering Trade in India

Increasing Use of Excavating Machinery

MR AINSCOUGH, Senior Trade Commissioner in India and Ceylon, has just issued a report "Some Aspects of British Trade in India," in which he calls attention to many items of interest particularly as regards irrigation and other public works.

A few items culled from his report are of considerable general interest, since they tend to very clearly show the changed and changing conditions of affairs pertaining in India.

With regard to the Sutley Valley project, which is intended to irrigate 5,108,000 acres, he says, that one great problem has been the supply of cheap labor. This was plentiful when the Punjab Triple Project which it extends and supplements was under construction, but much of it was absorbed by the new canal colonies thereby brought into being. It was realized at the outset of the Sutlej project that mechanical appliances would be necessary, not only to make good the shortage of labor but also to carry out the project in the shortest possible time.

The scheme is the first important irrigation project in India to replace coolie hand labor by the dragline excavator. Six of these machines have been at work, including a large Ruston and Hornsby dragline weighing 280 tons and shifting ten tons of soil per cut. One feature of them is that they are fitted with electric light and can work day and night. It is estimated that the large machines each replace 2,000 to 2,500 coolies, working 16 hours or more per day, wet or fine, including those seasons of the year, when manual labor usually leaves construction work to attend to agricultural pursuits.

British makers took up the manufacture of draglines only of late years. At first mistakes were made, but the performance of the new large machines on the Sutlej project and also on the Gezira Plain scheme in the Sudan, Mr. Ainscough remarks, give ground for hope that British draglines will find a large market in India. Of eight large and three smaller machines recently purchased for the Sukkur (Lloyd Barrage) scheme, no fewer than eight large British draglines were selected.

Dealing next with the Lloyd Barrage and canal project, Mr. Ainscough says that it will affect the British manufacturer in two ways. For the next few years there will be a very large demand for plant, machinery, and stores to be employed on construction work. Thereafter the increase in sind, as a result of three million acres of good land being placed under cultivation, will bring in its train a greatly increased demand for imported articles of all kinds. Important purchases of dragline excavators, sheet piling, structural steel of all kinds, rock-drills oil engines, air compressors, light railway material, etc., have already been made. In addition, such items as electrical generating plant, workshop machinery and machine tools, pumps, pile drivers, suction dredgers, concrete mixers, mortar mills, etc., will be required.

Mr Ainscough suggests that British manufacturers should instruct their branches or agents in India to pay special attention to these demands. The engineers on the work appreciate information with regard to and demonstrations of special plant suited to their requirements.

Intimately associated with this development of agricultural production in sind and the great irrigational extensions in the Punjab, is the future of the port of Karachi. It has ranked for a good number of years now as one of the five great Indian ports. The trade has multiplied sevenfold since the middle eighties. Owing to the lower port charges and facilities for rapid clearance of goods, there has been a distinct tendency during the past year for the Delhi market to import its ‘piece goods and other imports through Karachi rather than via Bombay—a tendency which will be encouraged when the harbor works, now in progress, are completed.

The west wharf scheme will ultimately provide an addition of thirteen berths on the west side of the harbor at a cost of some two millions sterling. The construction of three berths, each 550-ft. long, to accommodate vessels up to 34 feet in draught, is now in progress, and when these are completed the remaining ten berths will be taken in hand. The wharves will be equipped with hydraulic cranes able to deliver goods either into wagons or transit sheds. Subsequently the port commissioners will take in hand the reconstruction of the present berths on the east side of the harbor, the extension of the oil pier and the construction of a new boat basin. Mr. Ainscough points out that this work must be supplemented by improved railway communications and marshalling yards if the port is to keep ahead of future requirements.

The project of constructing a steel cantilever bridge over the Hoogly between Calcutta and Howrah is an ambitious one, for the cost will be some four millions sterling. The Bill introduced into the Bengal Legislature by government to obtain powersf or the construction of a new bridge met with some opposition from the Swarajist section, and instead of being referred to a select committee was ordered to be circulated for public opinion. Since the existing pontoon bridge is unsafe, the Bengal government has sanctioned its partial reconstruction. This work will occupy about two years, and it is expected to prolong the life of the bridge till 1932, if not longer.

According to Mr. Ainscough's generally expressed ideas the prospects of trade with India are growing daily.

New Fire Float for the London Fire Brigade

The London fire brigade has just ordered a new fire float which will be built by Merryweathers of Greenwich, the famous fire engineers. The new vessel, which will be 70 feet in length, will be fitted with internal combustion engines of 220 b.h.p., and Merryweather turbine pumps, having a combined capacity of 2,000 gallons per minute at high pressure.

Merryweathers were the first firm in the world to introduce a fire boat in which internal combustion engines were employed, and as the number of fire floats they have designed and built far exceeds the output of any other firm (it is believed that it considerably exceeds the total of all other firms combined) they may claim without exaggeration to occupy a unique position in this department of engineering activities. The London fire brigade is probably the premier fire brigade of the world, and the action of the London county council in placing with Merryweathers the order for the new float is a gratifying recognition of the standing of that firm.

Piping Contract for India

An Indian contract has recently been awarded to Messrs. T. W. Ward, Ltd., of Sheffield, for five miles of 6-inch steel lap-welded, screwed and socketted piping, which is to be despatched forthwith, and is believed to be the forerunner of still larger orders on the same lines.

Distribution of Petroleum in Burma

(*Continued from page 96.*)

locally, that is, by the larger companies who have efficient distributing and selling organizations. The lubricating fractions are also mostly absorbed locally, leaving practically only part of the wax which has to be shipped to distant countries.

Regarding the future of Burma as an oil-producing country, there are two schools of ideas. The older established countries leave it to be inferred that their geological departments have inspected the known potential oil-bearing areas and that they do not except extensive new fields capable of large production to be found. The newer companies and syndicates, however, believe that, though the more obvious fields are known, commercial possibilities exist, and that this can be proved with time.

It certainly would appear probable, as with other countries which, as far as the oil industry is concerned, are older than Burma, that fresh pools will be found in regions that were passed over in early days. The most promising localities would at present seem to be the Upper Chindwin and along the eastern flanks of the Arrakan-Yomah range. Though the geology of Burma has been broadly worked out, much detail work still remains to be done, and it is certain that, failing discoveries of large fields, isolated formations which have trapped economic deposits of oil will be found even if such deposits are not of the magnitude of the Yenangyaung and Singu fields.

There is also the possibility that payable oil may be found in the Eocene rocks; no accumulation worth mentioning has as yet been found in this system; but in some localities indications of oil occur in it.—*The Mining Magazine.*

TABLE SHOWING QUANTITY OF PETROLEUM PRODUCED IN BURMA DURING THE YEARS 1920, 1921, AND 1922

	1920		1921		1922	
Groups	Field Production. Imp. Galls.	Group Total. Imp. Galls.	Field Production. Imp. Galls.	Group Total. Imp. Galls.	Field Production. Imp. Galls.	Group Total. Imp. Galls.
ARRAKAN GROUP.						
Akyab	9,770		9,780		8,886	
Kyaukpyu	30,075		27,869		16,211	
		39,845		37,649		25,097
UPPER CHINDWIN GROUP.						
Upper Chindwin	1,022,766	1,022,766	1,182,782	1,182,782	1,210,914	1,210,914
CENTRAL GROUP.						
Yenangyat	3,176,231		2,510,533		2,413,416	
Singu	95,256,752		104,167,749		92,107,998	
Yenangyaung	176,285,048		184,420,147		179,741,493	
Minbu	3,835,198		3,706,831		3,940,416	
		278,553,230		294,805,254		278,203,323
THAYETMYO GROUP.						
Thayetmyo District	91,329	91,329	66,372	66,372	2,319,835	2,319,835
		279,707,170		296,092,051		281,759,169

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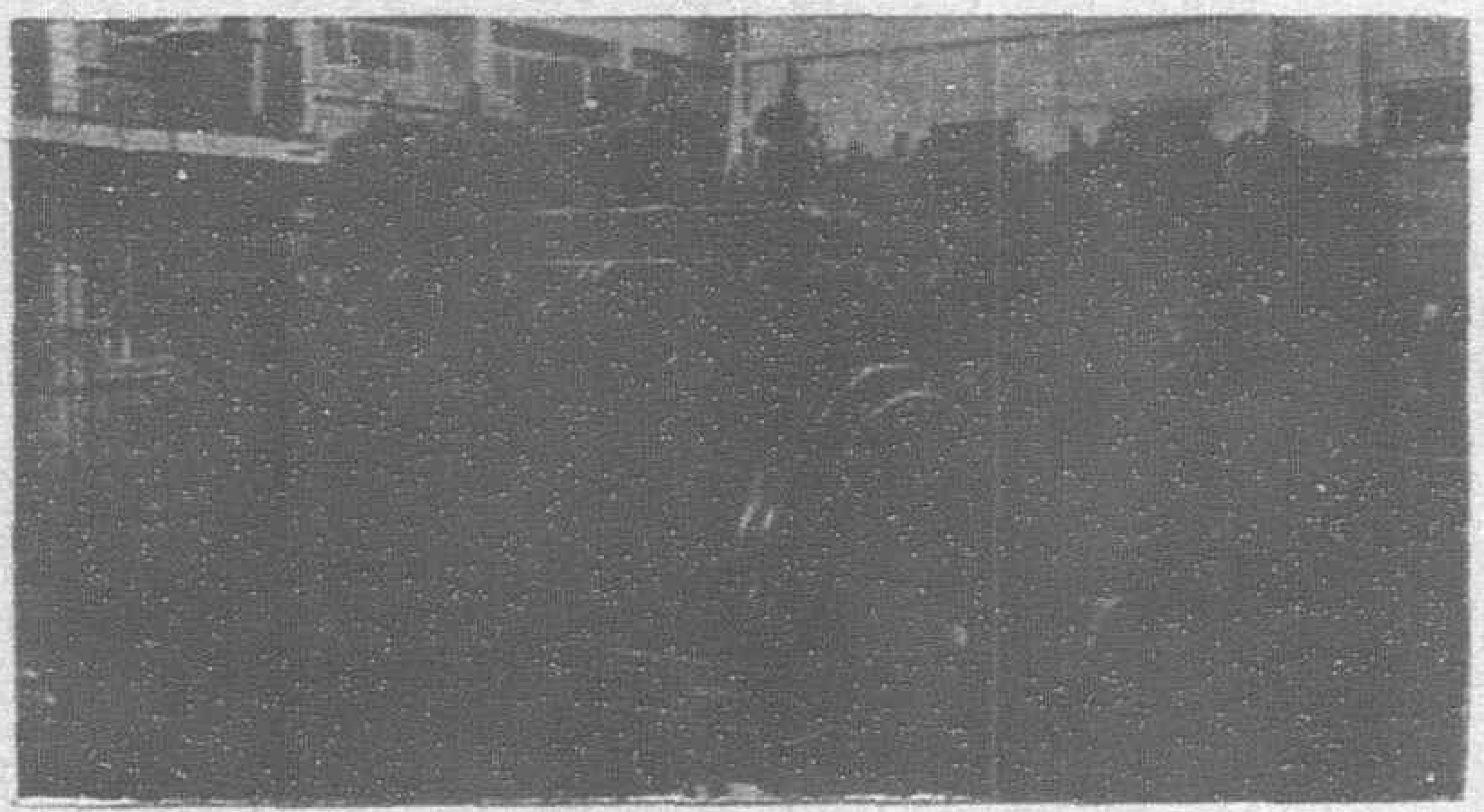

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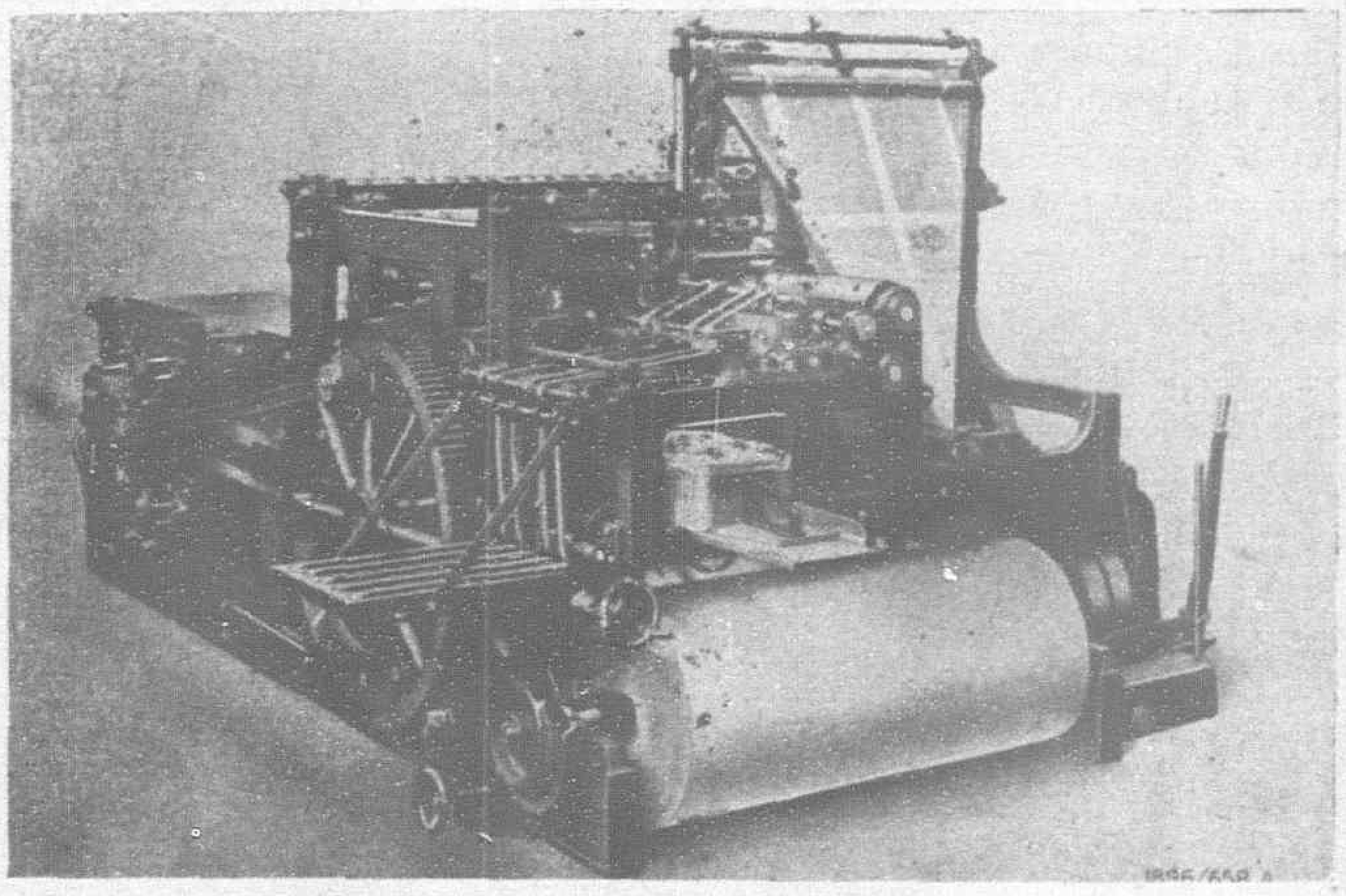

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